Direct Route through the North-West Territories of Canada to the Pacific Ocean.

PROPOSED

HUDSON'S BAY AND PACIFIC RAILWAY

AND

NEW STEAMSHIP ROUTE.

(WITH A MAP.)

BY

JOSEPH NELSON,

AUTHOR OF

"*Handbook of British Columbia and Vancouver Island*, 1858";
"*A Railway from Halifax to Vancouver through British Territory*, 1858";
"*The Hudson's Bay Company, 'What Is It?'* 1863"; &c., &c.

1893.

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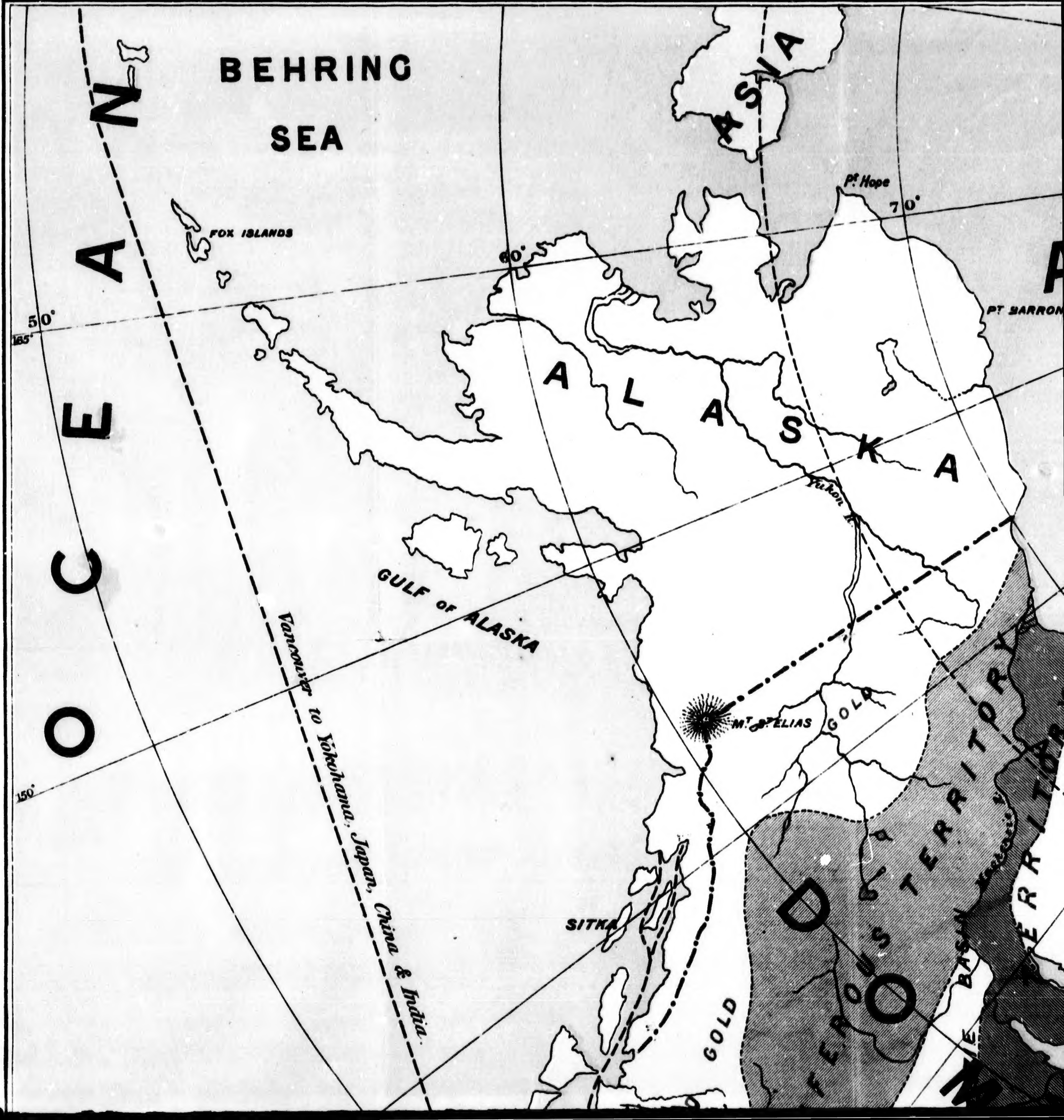
Can. Nelson, Joseph.

PROPOSED HUDSONS



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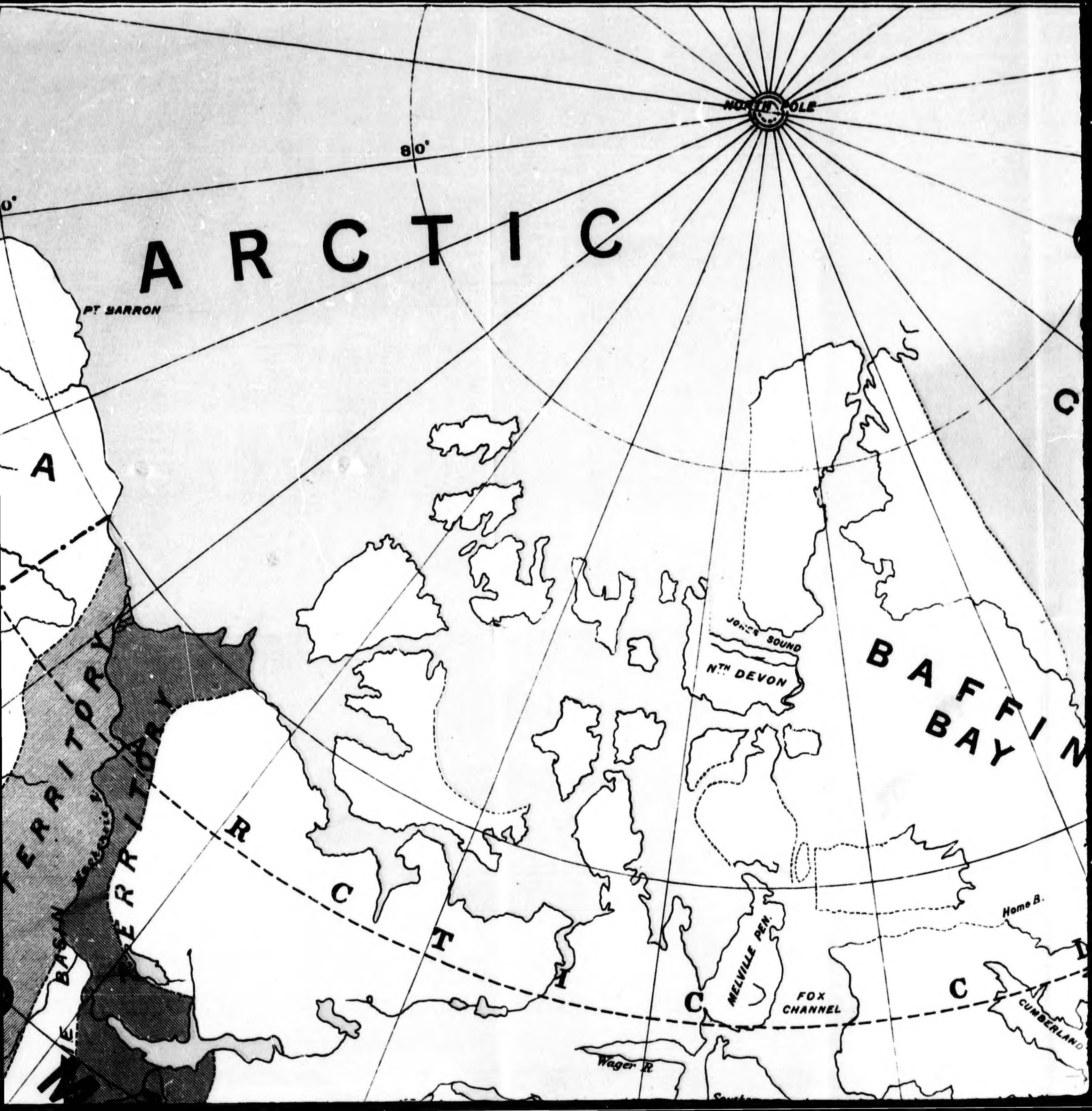

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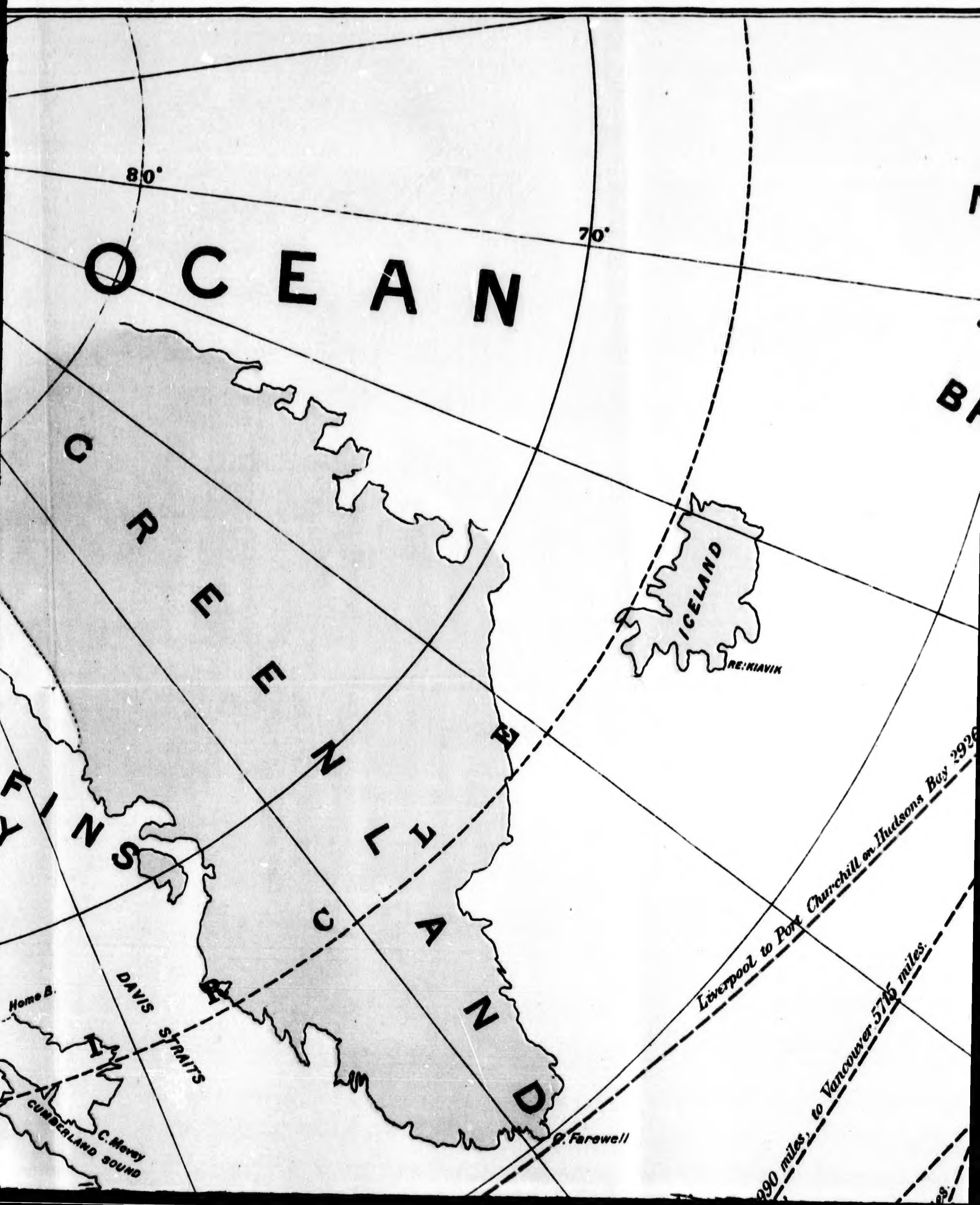

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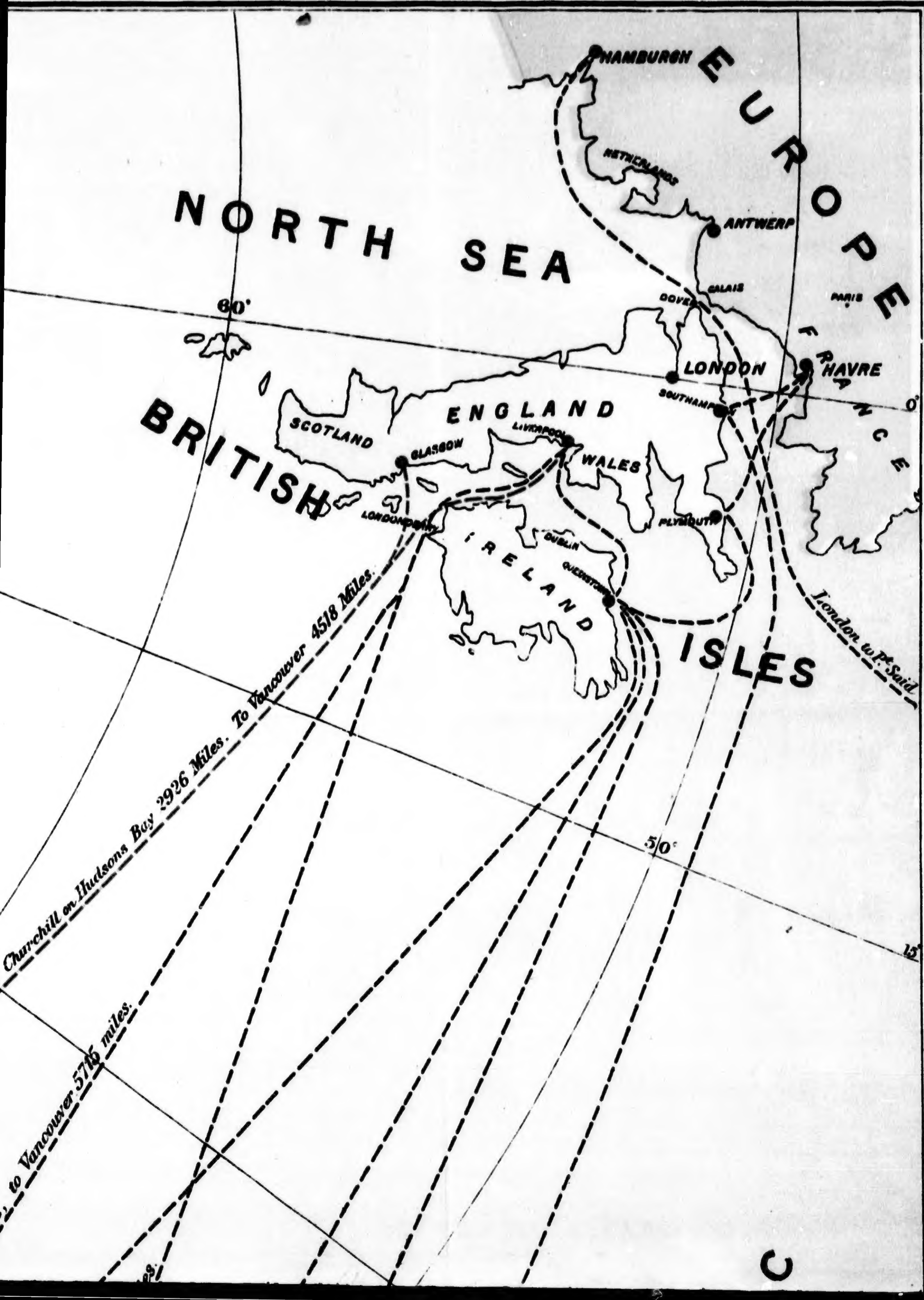

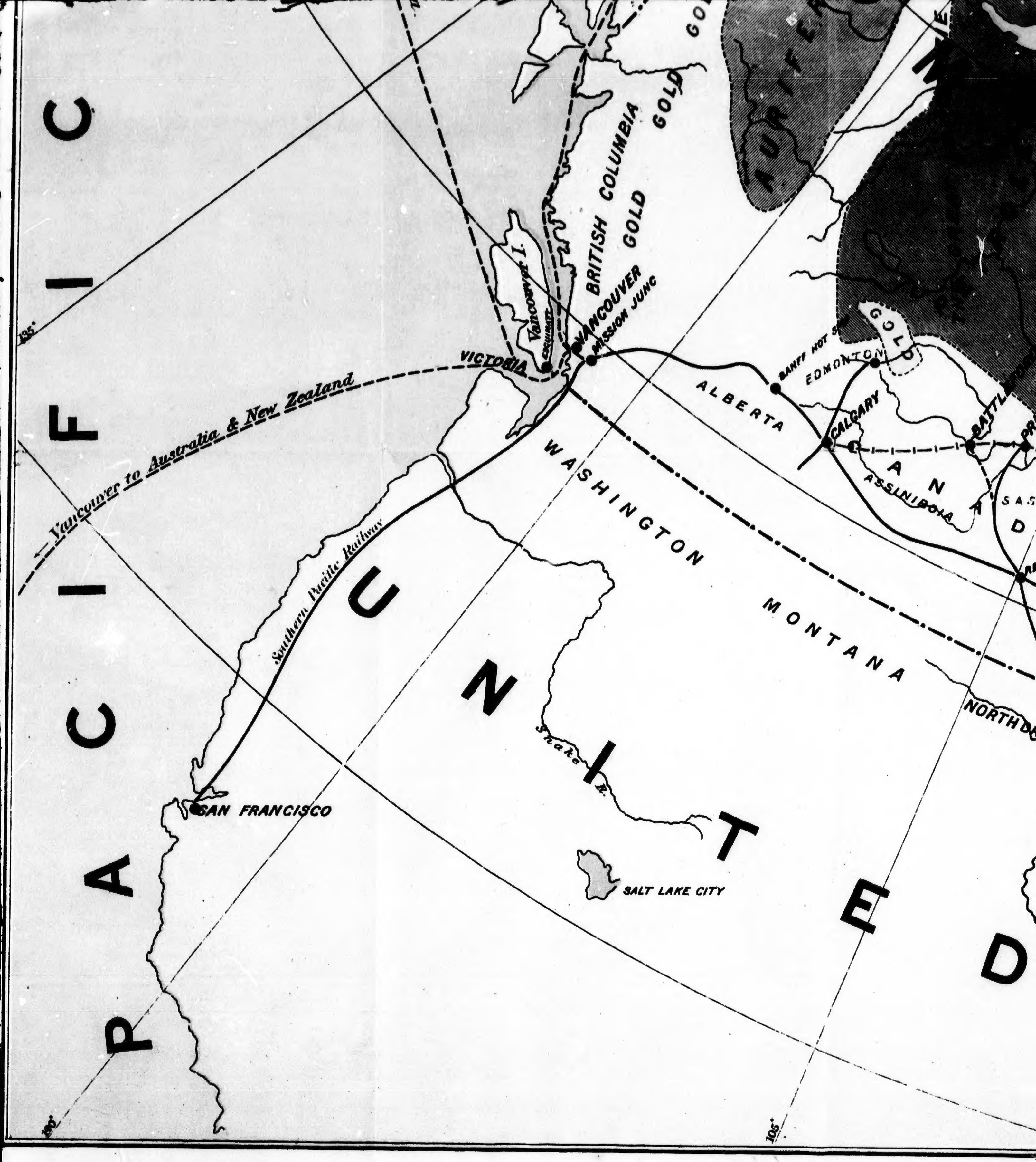
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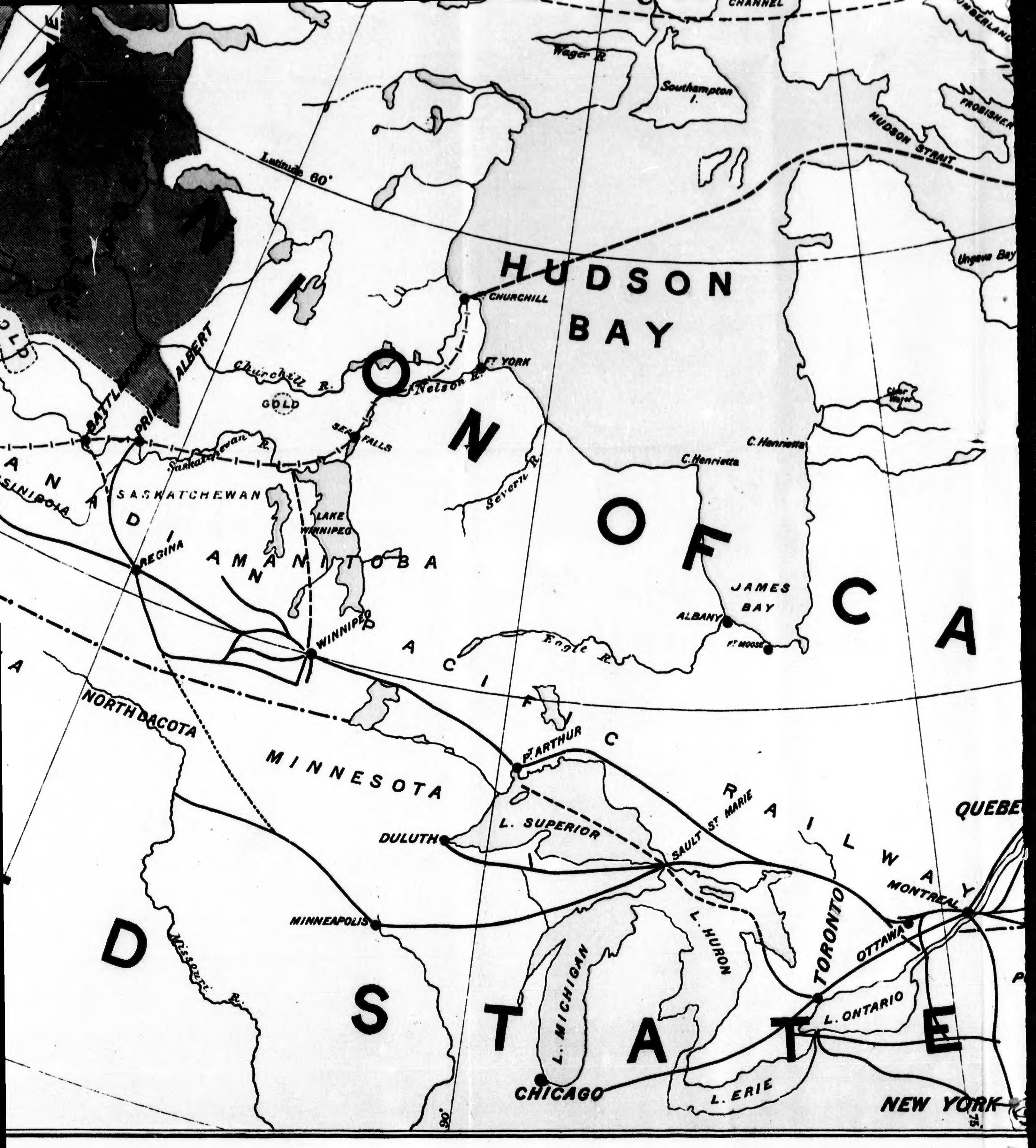
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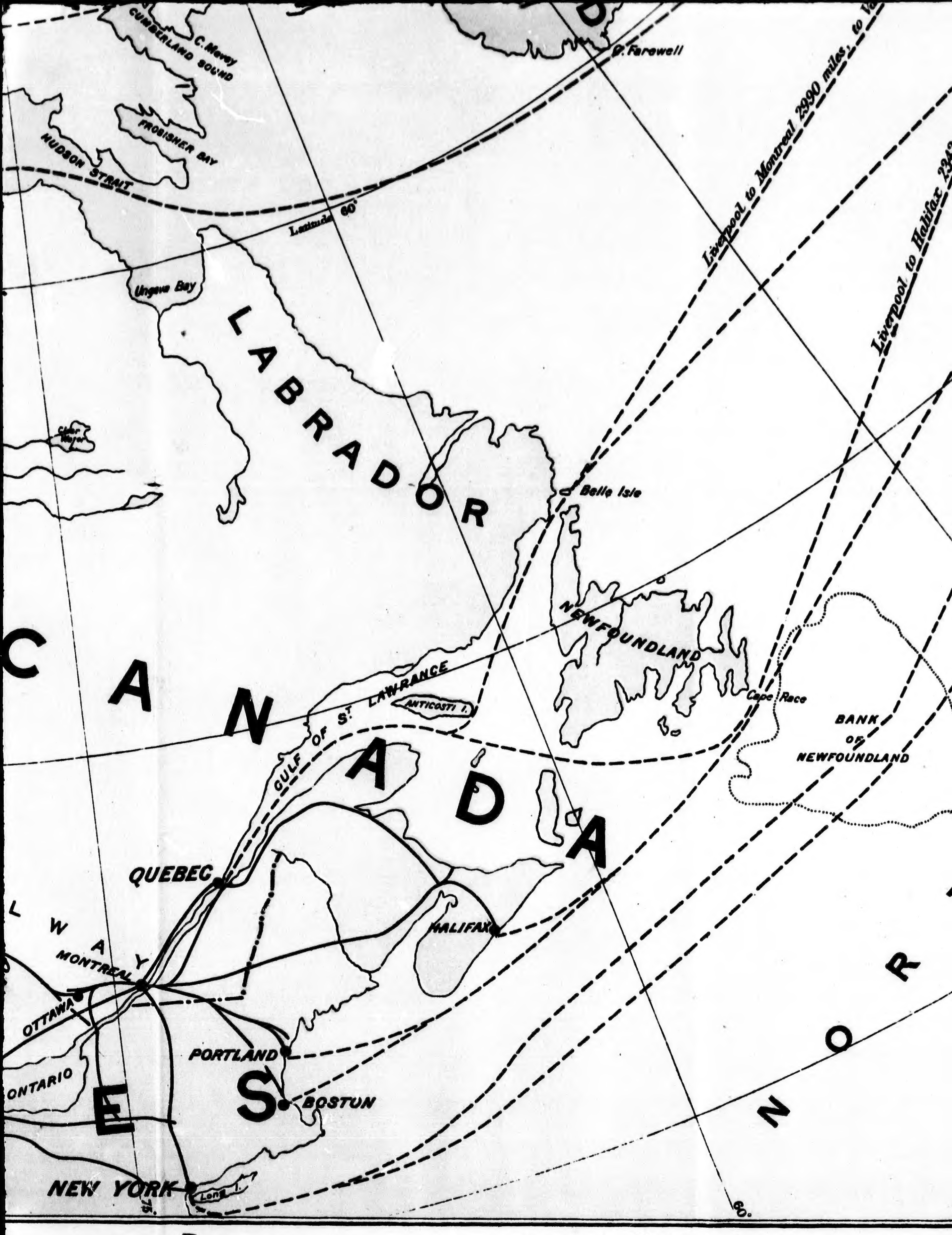
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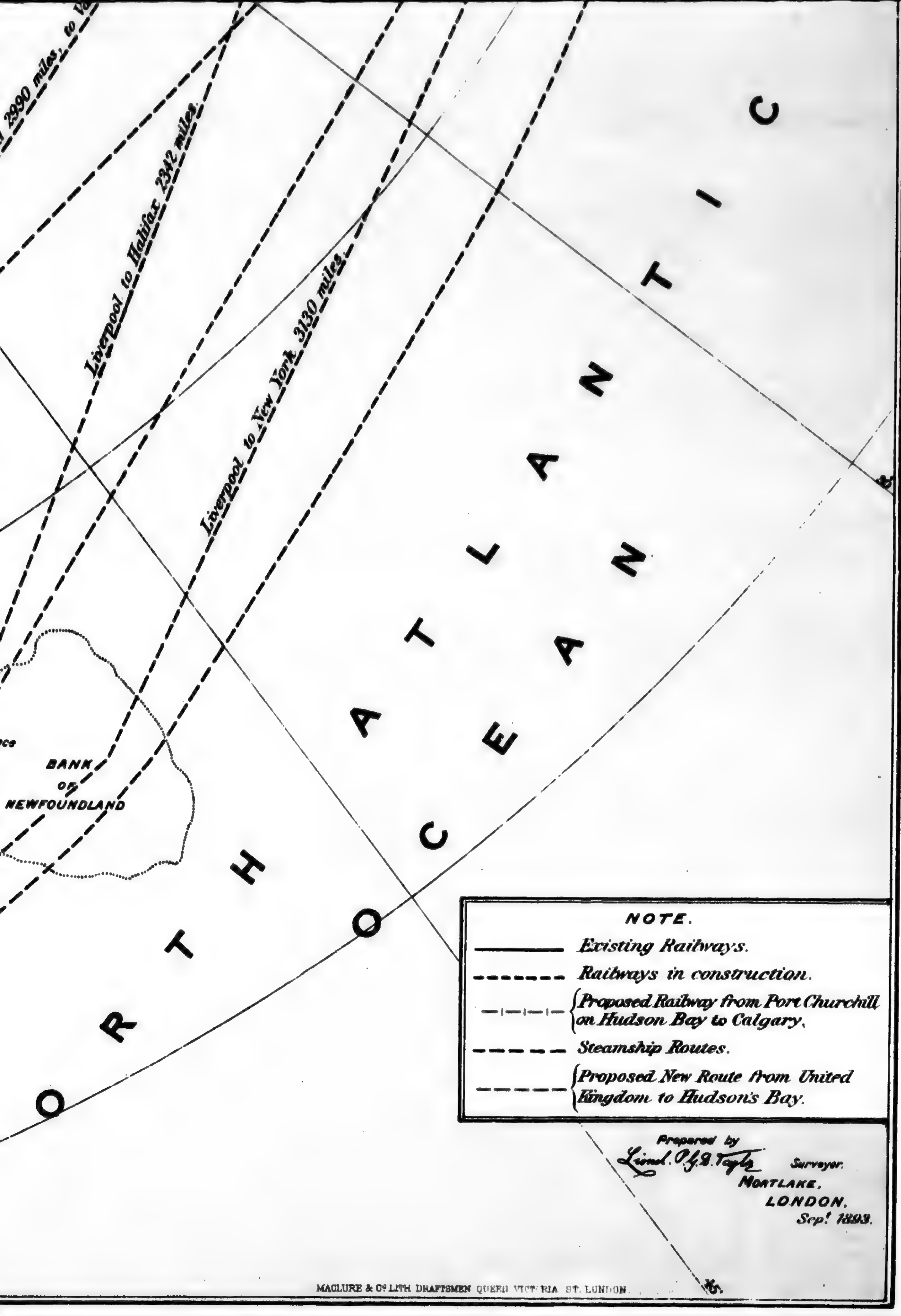
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ce
BANK OF NEWFOUNDLAND
NOTE.
Existing Railways.
Railways in construction.
Proposed Railway from Port Churchill on Hudson Bay to Calgary.
Steamship Routes.
Proposed New Route from United Kingdom to Hudson's Bay.

Prepared by
Lionel. P.G.B. Taylor Surveyor.
MORTLAKE,
LONDON.
Sept 1893.

MACLURE & Co LITH DRAFTSMEN QUEEN VICTORIA ST. LONDON.

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1893.

DEDICATED, BY PERMISSION, TO
THE RIGHT HONOURABLE
THE MARQUIS OF DUFFERIN AND AVA, K.G.,
BRITISH AMBASSADOR TO FRANCE;
FORMERLY
GOVERNOR-GENERAL OF CANADA,
VICEROY OF INDIA,
AND
BRITISH AMBASSADOR TO ITALY.

Hudson's Bay and Pacific Railway and New Steamship Route.

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Map of British North America, with the Proposed Railway and Steamship Route, etc., delineated thereon.

Hudson's Bay and Pacific Railway and New Steamship Route.

WITH A MAP.

It is proposed to apply to the Dominion Parliament of Canada for the necessary powers to construct and work a railway from Port Churchill on Hudson's Bay viâ Prince Albert and Battleford, to a junction with the Canadian Pacific Railway at Calgary, in the territory of Alberta, a distance of about 1,000 miles, and for a Government Money and Land Grant in aid thereof, and also a bounty for steamers running between the railway terminus at Port Churchill and the United Kingdom.

COMPARATIVE TABLE OF DISTANCES.

	Miles.	
Liverpool to Port Churchill	2,926	
Port Churchill to Calgary	1,000	
Calgary to Vancouver *via* Canadian Pacific Railway	642	
	4,568	
Liverpool to Montreal	2,990	
Montreal to Vancouver *via* Canadian Pacific Railway	2,906	
	5,896	
Saving in distance *via* Port Churchill		1,328
Liverpool to Mission Junction *via* Port Churchill	4,526	
Mission Junction to San Francisco	1,073	
	5,599	
Liverpool to Mission Junction *via* Montreal and Canadian Pacific Railway	5,854	
Mission Junction to San Francisco	1,073	
	6,927	
Saving in distance *via* Port Churchill		1,328
Liverpool to San Francisco *via* New York and Union Pacific Railway	6,630	
Liverpool to San Francisco *via* Port Churchill	5,599	
Saving in distance *via* Port Churchill		1,031

which will effect a saving of upwards of two days between the United Kingdom and Vancouver, San Francisco, Japan, China, India, and Australia; and it is estimated there will be a saving of £3 to £4 a head on immigrants, £3 to £4 a head upon cattle, £1 a ton upon wheat and other cereals, and upon all other products—merchandise, etc.—from 30 to 40 per cent.

CHURCHILL HARBOUR.

Sir Henry Lefroy, President of the Geographical Section of the British Association, in his address at Swansea in 1880, speaking of Churchill Harbour (see Appendix A, Page 29), said: "It will undoubtedly be the future shipping port for the agricultural products of the vast North-West Territory, and the route by which emigrants will enter the country." Dr. Bell, Director of the Geological Survey of Canada, in his address to the Royal Geographical Society, in October, 1881 (see Appendix A), said: "The Churchill River is remarkable for having at its mouth a splendid harbour, with deep water and every natural convenience for the purposes of modern commerce. It can be entered with ease and safety by the largest ships at all stages of the tide. On the point at the west side of the harbour stands the old Fort Prince of Wales, which is probably the largest ruin in North America.

Mr. George A. Bayne, civil engineer, in his evidence before the Select Committee of the Legislative Assembly of the Province of Manitoba, having been engaged on the survey of this proposed railway and harbour (see Appendix B, Page 34), said: "The Harbour of Churchill is one of the finest I have ever seen. Nature has done so much for it in the way of protection from storm and the depth of water, that without further improvements it is fitted to take rank among first-class ocean ports. I took careful soundings, and found at a distance of 400 feet from high-water mark, along the shore, a depth of 38 feet, deepening suddenly to 50 feet. These soundings were taken at extremely low tide. The bay and harbour are open for navigation from the 15th of June to 20th October for ordinary sailing vessels. Sometimes the ice does not take fast in the harbour until the 1st of December. The ice is never solid in the bay for a greater distance from the shore than half a mile,* and this is liable to be broken up by wind and tide, so that there will be found little difficulty that experience and practice will not overcome to prevent the loading and unloading of steamers all the winter."

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* This can be removed by means of an ice breaker as now practised by the Russian Government in ports and rivers within the Arctic Circle.

Mr. William Smith, Deputy Minister of Marine and Fisheries, in an article which appeared in the "Nautical Magazine" of August 1892, speaking of Churchill Harbour, says: "It is a splendid harbour, which can be entered with ease and safety at all stages of the tide, thus offering every advantage for shipping, and its entrance is destined some day to be the main commercial point of this inland sea. The basin for anchorage, with a depth at low water of over four fathoms, is about 1,400 yards north and south, and about 1,000 yards east and west. The harbour is pronounced to be an eminently safe one. The approaches are well marked, and in clear weather the land stands out bold and high, being easily identified at a distance of ten or twelve miles. The harbour is well adapted for a railway terminus, as the necessary docks could be easily and cheaply built, and the deep water basin enlarged at small cost. Stone lies at the water's edge ready to be laid into the docks or piers, and Nature seems to have left little to be done to make this a capacious port, capable of doing business on a large scale, and, what is of the greatest importance, an inlet by Hudson's Bay is the only thoroughly independent channel which can ever be established between Great Britain and her North American Possessions."

EVIDENCE AS TO THE COMMERCIAL PRACTICABILITY OF THE NAVIGATION OF THE STRAITS AND HUDSON'S BAY.

The evidence on this, the most important of all questions, is complete in every particular so far as can be judged from investigation and practical experience. First we have the marvellous record of the Hudson's Bay Company (see Appendix D, Page 36), who for 223 years have been trading between the United Kingdom and the shores of this great inland sea, with the loss of only two vessels, the "Graham" and the "Kitty." Upwards of 800 vessels are said to have passed through the Straits, including British troopships, emigrant ships, war vessels of the English and French (some of them carrying 74 guns), as well as ships bound on voyages of discovery, trade and whaling.

One of the most interesting and early reports of the navigation and resources of Hudson's Bay is that of Dr. Robert Bell, F.G.S., Director of the Geological Survey of Canada, an epitome of which was read before the Royal Geographical Society in 1881 (see Appendix A, Page 22). Dr. Bell, who had spent six seasons since 1869 in explorations around the bay itself and its vicinity, amongst other things, says: "The total area of the bay is about 500,000 square miles, enclosed by land on all sides except the north-east, where it communicates by several channels with the outer ocean, the principal or best known of these straits being about 500 miles in length, and an average width of 100 miles. The basin of Hudson's Bay has a width of 2,100 miles from east to west, and a length of 1,500 miles from north to south, and its dimensions approach the enormous number of 3,000,000 square miles. Over a great part of this vast region there is a temperate climate; numerous large rivers and lakes are embraced within these limits."

Both the bay and strait are remarkably free from rocks and shoals, the depth of water is very uniform, and averages about 70 fathoms. The Nelson River, with its tributaries, may be considered one of the first-class rivers of the world. The shores and islands of the bay are rich in minerals, especially in iron ore of a high grade, which lies exposed in inexhaustible quantities. The Canadian North-West Territories, embracing hundreds of millions of acres of fine land, are capable of becoming the greatest wheat field in the world. The centre of this immense agricultural region probably lies to the north of the Saskatchewan. If we look at a map we shall see at a glance that the shortest route between these territories and England is through Hudson's Bay; even the City of Winnipeg, which is near the south-eastern extremity of these territories, is at least 800 miles nearer to Liverpool by Hudson's Bay than by the St. Lawrence route. Now let us consider the relative progress of two persons travelling to Liverpool from the centre of this vast region, the one going to Winnipeg and the Valley of St. Lawrence, and the other by the Nelson Valley and Churchill Harbour. At about the same time the former requires to reach the City of Winnipeg, the latter arrives on the sea coast at Churchill. From

Winnipeg our traveller has still to go 1,291 miles by the Lake Superior Route, or 1,698 if he prefer the whole rail journey through American territory viâ Chicago, before he reaches Montreal, where he will still be about as far from Liverpool as our traveller when he reached Churchill. In other words, the route from the North-West Territories to England viâ Hudson's Bay saves the whole distance between Winnipeg and Montreal. The great saving in distance represents an important economy in time and money, or in freight and passenger rates. If the grain, cattle, and other productions of the North-West Territories could reach a European market only through Ontario and Quebec, or by way of New York, a large proportion of their value would necessarily be consumed by the long land carriage; whereas if they can find an outlet at Churchill, there will be an average saving of 1,291 miles as compared with Montreal, and upwards of 1,700 as compared with New York, and this without any increase in the length of the sea voyage. In effect this will place a great part of the farming lands of the North-West Territories in as good a position with regard to a seaport as are those of Ontario, West of Toronto, and will consequently increase the value of every description of farm produce, and therefore of the farms themselves. Some kinds which could not be sent out of the country at all by the longer land route may be profitably exported by the shorter one. For the transportation of both grain and fresh meat, as Colonel Dennis has pointed out, the northern route, besides the shortening of distance, would have greater advantages over all those to the south, owing to its cooler and more uniform temperature. Heavy or bulky goods of all kinds would, of course, be imported to the north-west by the shortest land route. In regard to the export and import of live stock this independent route will possess a great importance to these territories. Hitherto cattle, horses, hogs, and sheep have there enjoyed an immunity from almost all forms of contagious diseases, and owing to the healthy nature of the climate for these animals, it is hoped this state of things will continue. The domestic animals in the United States and the older Canadian Provinces being occasionally afflicted with contagious diseases, it becomes dangerous for European countries on their importation. In the event of an epidemic of this nature existing in some part of these regions, but not in the North-West Territories, there need be no objection to exporting live stock from the latter by way of Hudson's Bay.

As a route for emigrants from Europe that by Hudson's Bay possesses not only the advantage of the short land journey, but the still more important one to us of entirely avoiding the United States and the populous parts of Canada, in both of which it is well known a very serious percentage of the immigrants destined for our North-West lands are every year enticed away to settle in the great Republic. An inlet by Hudson's Bay is the only thoroughly independent Channel which can ever be established between the British Islands, and our great and valuable territories in the interior of North America; and it is very desirable on national grounds that it should be opened up. Troops have hitherto been sent to the Red River Settlement on more than one occasion by way of Hudson's Bay, while the intervening country was, as it is yet, in a state of Nature. Were a short railway built through this tract it would at once become for military purposes an easy connecting link with the Mother Country.

An impression has long prevailed that Hudson's Bay and Strait could not be navigated for the ordinary purposes of commerce on account of ice, but this idea is probably destined to prove chimerical. The fact that these waters have been successfully navigated by ordinary sailing vessels for 200 years, in order to secure what little trade the country afforded, indicates what may be expected from properly-equipped steamships so soon as the larger business of the future may require their services in this direction. The conditions of the seaborne commerce of the North-West in relation to Hudson's Bay will probably turn out to be similar to those of the rest of Canada with reference to the Gulf of St. Lawrence. In both cases everything must be done during the summer. Yet Hudson's Bay is open all the year round. No one would be likely to suppose that a sea of such extent in the latitude of the British Islands would ever be frozen across. The lower St. Lawrence is also partly open, even in the middle of winter, but the difficulty in both cases is the impossibility of getting into harbours. A harbour such as that of Churchill on Hudson's Bay would have the advantage over Quebec or Montreal of connecting directly with the open sea, and here in the autumn vessels would not be liable to be frozen in as occasionally happens in the St. Lawrence. There has been some discussion as to the length of time during which Hudson's Straits and Bay might be navigated each year. There does not appear to be much evidence that the straits any more than the bay is closed at any season. Its great width, depth, and strength of the tides probably keep it open all winter. My own experience, and that of many others, leads me to believe that the climate generally of Hudson's Bay is much better than some writers have represented it to be. From all that I could learn or observe, it appears that the straits and bay may be navigated, and the land approached by steamers during an average of four and half months each year, or from the middle of June to the end of October. Churchill Harbour does not freeze up until November, and the sea is open close to it the whole winter.

In order to obtain full and accurate information on this important question a Select Committee of the Parliament of Canada was appointed in 1884, which took evidence and reported on the Hudson's Bay route to England (see Appendix E), wherein they say: "Let us suppose the possibility of establishing a line of steamships between Liverpool and Hudson's Bay Ports, which would carry freight at the same rates as the steamships between Montreal and Liverpool. Now, the distance between Winnipeg and Montreal is about 1,400 miles, while it is not more than 700 to York Factory (on Hudson's Bay). It costs 1½ cents per ton per mile to forward grain from St. Paul to New York, which, applied to the distance to be traversed between Winnipeg and Montreal, would give a charge of 21 dollars per ton, or of 10 dollars 50 cents from Winnipeg to York Factory—say the half. If, now, the ton is reckoned as equal to 33 bushels of grain, the difference in freight in favour of the Hudson's Bay route would be a saving of 32 cents per bushel, or, in other words, an additional profit of 6 dollars 40 cents per acre, yielding an average of 20 bushels. Other calculations make the saving one-third the present cost of transport realised by the farmers of the west upon the opening of a channel of exportation by the Hudson's Bay. A large proportion of importation from Europe would take this road; the immigrants proceeding westward would see that they could shorten the annoyances, the delays, and the costs of a journey across the Continent by from 800 to 900 miles. The export of butcher's meat would alone furnish a considerable portion of the lading of Hudson's Bay steamers, and many persons are of opinion that this route would command a considerable portion of the import and export trade of the North-Western States of the Union. We speak merely incidentally of the Hudson's Bay fisheries and of the working of the minerals, almost inexhaustible in their richness, which are to be found there. *To sum up the whole, Hudson's Bay appears to us to be destined to perform the same services for the vast territories of the North-West that the Gulf of St. Lawrence does for the vast and fertile valley bearing the same name.*

"From tables given to the Government by the Hudson's Bay Company in 1880, it appears that the breaking-up of the Hayes River at York Factory, for a period of 53 years, took place on the average on the 15th of May; the mean formation of the ice gives the 20th of November, which would give an average of five months or thereabouts for navigation.

"In concluding this report, your committee believe it to be their duty to remark upon the absolutely impartial character of their labours. Undertaken without reference to pre-conceived opinions, the inquiry has been conducted in a manner well calculated to throw the greatest possible amount of light upon the conditions and character of the navigation of this portion of our maritime Dominion. The information obtained cannot be said to form a complete examination of the question; but your committee are satisfied, if they have been able by their efforts to contribute to the critical examination and solution of a problem which will assure to Canada an immense development of its marine, the monopoly of the traffic of the North-West, and a fresh pledge of prosperity and grandeur.

"(Signed) J. ROYAL, Chairman."

The committee recommended that an expedition should be sent out for the purpose of establishing stations on both sides of Hudson's Straits, at which continual daily observations could be taken and recorded on the weather, tide, and temperature, condition and movements of the ice, etc., for a period of at least twelve consecutive months; and in accordance with this resolution a steamer, called the "Neptune," under the command of Lieut. Gordon, R.N., was despatched in the summer of 1884, accompanied by a numerous and efficient staff. After having stationed the staff on several of the important points on the straits and bay, the "Neptune" returned to St. John's, Newfoundland, about the end of October. Lieut. Gordon, in his report, says: "The ice has been supposed hitherto to be the most formidable barrier to the navigation of the straits, but its terrors disappear to a great extent under investigation. We met no icebergs in Hudson's Bay, nor did we hear of any being seen there; in the straits a good many were seen. The icebergs seen in Hudson's Straits in August and September would form no greater barrier to navigation, nor do those met with off the Straits of Belle Isle, nor were they more numerous in Hudson's Straits than they frequently are off Belle Isle." Hudson's Bay may be regarded as a vast basin of comparatively warm water, the effect of which must be to considerably moderate the winter climate to the south and east of it. The bay never freezes over so far from the shore at Port Churchill but that clear water can be seen. The bay has been proved to be navigable early in June." The expedition visited Hudson's Bay again in 1885 and again in 1886, when Lieut. Gordon made his final report, in which he says: "I think it well to state that I am not required to report on the commercial aspect of the case or whether Hudson's Straits navigation can be made to pay, nor do I in the seasonable limits given mean to state that it is impossible for a ship occasionally to get in earlier or leave later; but having carefully considered the subject, I give the following as the season during which navigation may in ordinary years be regarded as practicable for the purposes of commerce, not indeed to the cheaply-built freight steamer, commonly known as the 'Ocean Tramp,' but to vessels of about 2,000 tons gross, fortified for meeting the ice, and of such construction as to enable them to be fair freight carriers. I consider the season for the opening of navigation to such vessels as the above, on the average, will fall between 1st and 10th of July, the closing would be about the first week in October."

Admiral Markham, R.N., accompanied the third expedition in 1886, and in an address read before the Royal Geographical Society on the 11th of June, 1888, amongst other things said: (see Appendix G, Page 47), "By a fortunate accident I was enabled to avail myself of an invitation I had received to take passage on the 'Alert' during this cruise. I considered myself very fortunate in having the opportunity afforded me to do so, for it had long been my wish to visit Hudson's Bay. The offer, therefore, of going in the 'Alert,' which would enable me to make the passage of the straits as well as of the bay was too good to be refused, and I eagerly availed myself of it. I was thus enabled to form my own judgment of the state and condition of the ice in Hudson's Straits during, at least, one season of the year, while my observations, confined with a comprehensive study of all that had been written on the subject, would enable me to form my own views regarding the practicability of the route as a commercial highway. I was also able to form a better estimate relative to the duration of the navigable season.

"I might observe that I was quite ignorant of the controversy that had been carried on for some time between those who were in favour of the Hudson's Straits as a commercial route, and those who were opposed to it. I was, therefore, in a better position to form a perfectly impartial and unbiassed opinion.

"Under these circumstances I joined the 'Alert' at Halifax and sailed in her from that port on the 23rd of June.

"On the 5th of July, we reached the entrance of Hudson's Straits, where we were detained for some days, partly by thick weather, and partly by loose streams of ice; but the latter was never packed sufficiently close to prevent even a slow steamer like the 'Alert,' making fairly good progress. From the 9th to the 11th of July scarcely any ice was seen, and a distance of 200 miles was accomplished in about 36 hours. This fact alone, without further evidence, is in itself sufficient to show how free the eastern part of the straits was from ice; for the 'Alert,' if driven at her full speed could only steam about six knots an hour.

"Steam has now effected a complete revolution in ice navigation, and the most advantageous time for pushing on is when the ice is loose. Under similar circumstances, a sailing ship would be utterly hopeless. It is, therefore, only reasonable to infer that what has been performed regularly, and, year after year, by sailing ships, can be accomplished with greater regularity, and certainly by well-built steamers, specially constructed for ice navigation, and provided with powerful machinery.

"The nature and consistency of the ice in Hudson's Straits are such that, with an efficient steamer, the passage could be accomplished with very little delay or difficulty. This being the case it is not surprising to hear that the people of the North-West are anxious to have a seaport on the shores of Hudson's Bay, and to secure the construction of a railroad to connect such port with Winnipeg, or some equally convenient depot on the newly-established line of the Canada and Pacific Railway.

"The achievement of such an undertaking would result in shortening the distance that the produce of the country destined for exportation would have to be transported by one half. As the cost of transport by rail is governed by the distance to be conveyed per mile, it will at once be understood that if the mileage is reduced by one half the cost of conveyance will be diminished in the same proportion. It has been estimated that the result of the construction of a railroad from Winnipeg to Hudson's Bay would be a clear gain to the farmers and producers of the North-West of about £3 per head of all cattle exported, and 5s. upon every quarter of grain sent for shipment.

"In conclusion, we must again call to mind the fact that the vessels employed on the Hudson's Bay service have hitherto been sailing ships. Steam has now robbed ice navigation of many of its difficulties and dangers, and it is only fair for us to assume that, with the appliance that science has since revealed to us, we can in these days achieve with greater ease and celerity, and with more assured certainty, as much as was accomplished by Hudson and Baffin, by Button and Luke Fox, in their rude and poorly equipped flyboats.

"The case, then, can be briefly stated. If sailing ships have annually taken the furs and other merchandise of the Hudson's Bay Company through the straits for the last two centuries, *à fortiori*, it may be looked upon as certain that powerful steamers will be able to do the same for the produce brought to the west coast of Hudson's Bay by a railway from Winnipeg.

The Legislature of the Province of Manitoba appointed a Select Committee, in 1884, to procure evidence and report upon the practicability of establishing a system of communication, viâ Hudson's Bay. After taking the evidence of a number of men, with a thorough practical knowledge of the subject, say in their report (see Appendix H), "Many of the gentlemen examined have had personal and extended experience as officers and servants of the Hudson's Bay Company at their ports on Hudson's and Ungava's Bays, and the rivers entering into those bays. No evidence has been given that goes to prove that Hudson's Straits and Bay proper ever freeze over, or that the ice met with in those waters is sufficient to prevent navigation at any time of the year. That, consequently, the period of navigation is defined by the time during which the ports, harbours, or roadsteads on the shores of the bay, can be entered by vessels of a suitable description for such navigation. From the evidence adduced it appears that such ports or harbours are open, on an average, from four and a half to five months in each year, to ordinary vessels."

The following is a brief statement of some of the evidence taken as to the period during which navigation can be carried on with ease and safety:—

Dr. Bell, Director of the Canadian Geological Survey, who made five voyages through the straits: Navigable from the middle of June to the middle of November.

Captain Jacob Tabor, New Bedford whaler: From the first of July to the first of November.

Captain St. Clair, New Bedford whaler: From the first of July to the middle of November.

Captain Clisby, of New London Connecticut, who has had fourteen years' experience in those waters: Four months, and often five.

Captain William Kennedy, who accompanied an expedition in search of the remains of Sir John Franklin, and who has had eight years' experience of the straits: From June to November.

Mr. Wm. A. Archibald, for many years in the service of the Hudson's Bay Company at Moore Factory: From June to December.

Captain William Hackland, in the Hudson's Bay Company service for 39 years; straits never freeze; no reason why steamships should not navigate at any time.

The Canadian Government sent three expeditions to the straits and bay, 1884-85-86, under command of Lieut. Gordon, in all of whose reports the period of free navigation is placed at four months.

Capt. J. J. Barry, the first officer in each of the expeditions, thinks ocean steamships can enter as early as June, and can certainly come out as late as December.

Mr. W. A. Ashe, Superintendent of the Quebec Observatory, the officer in charge of the North coast of the straits, from August, 1884, to September, 1885, says the straits are navigable from 4½ to 6½ months, varying according to the class of ship.

Mr. C. R. Tuttle, secretary to the first year's expedition, places the period of navigation at eight months.

Mr. William J. Rynner, an officer who accompanied the three expeditions: From June to December.

Mr. D. J. Beaton, who made the round voyage with the expeditions of 1885, reported the straits navigable from May to December.

Admiral Markham, R.N., an experienced Artic navigator, accompanied the expedition of 1886: He reports, "I believe the straits will be found navigable for at least four months of every year, and often five, or more. There will, I have no doubt, be many years when navigation can be carried out safely and surely, from the first of June until the end of November."

Captain John Macpherson, of Stepney, London, as first officer and captain in the service of the Hudson's Bay Company, made voyages from London and Stromness, to Hudson's Bay, and returned annually for twenty years, says: "There is no reason why steamships could not make the passage of the straits as early as the first of June, and come out as late as the middle of November."

The Russian Government are carrying out an extensive system of railways in Siberia (the terminus of which is at Vladivostock, on the Japan Sea), of about 5,000 miles, at an estimated cost of fifteen millions sterling. The port of entry by which the material is to be conveyed for the construction of this undertaking, and the outlet for the future produce of the country, is the mouth of the Yenisei River, which is about 70 degrees of north latitude (in the Arctic Circle), they propose to keep open the navigation by steam ice breakers, two of which have recently been constructed for the Russian Government in this country.

EXTENT AND RESOURCES OF THE NORTH-WEST TERRITORIES OF THE DOMINION OF CANADA.

The country at present under local government comprises the Province of Manitoba, covering an area of 64,000 square miles, with Winnipeg as its capital, and the three territories of Assiniboia, Saskatchewan, and Alberta, covering an area of 303,000 square miles, with Regina as their capital. The whole of this vast region, extending from about 25 miles west from Lake Superior to the Rocky Mountains, a distance of 1,350 miles, and from the forty-ninth parallel of latitude North, to the water-shed of the Saskatchewan River, an average distance of 350 miles, embraces an area of 462,500 square miles, or 269,000,000 acres, two-thirds of which has been proved to be capable of producing the finest wheat, and the rest admirably adapted for stock raising and dairy farming. The whole of this region, including a great portion of the States of Minnesota and North Dakota, in the United States, is drained by the lakes and tributary streams of the Nelson River, into Hudson's Bay, in latitude 53 North. It comprises the richest and most extensive undeveloped wheat-producing lands in the world, and access to which, from the United Kingdom, by ordinary steamers viâ Hudson Bay, can be reached within eight days.

During 1891, there was under cultivation in the Province of Manitoba, and the three territories of Assiniboia, Saskatchewan, and Alberta, 1,300,000 acres, which produced 25 million bushels of wheat, and 30 million bushels of barley and oats, whilst the heads of cattle were estimated at about 600,000.

Mr. Ruttan, engineer to the City of Winnipeg, in a recent publication, estimates that: "Within the next decade, this Province (Manitoba), and the territories, will be producing 200 million bushels of wheat annually, and that every cent per bushel saved in the cost of transportation would mean two million dollars annually to the farmers of the North-West; that 200 million bushels of wheat means six million tons of merchandise; to get that quantity to a port of export, would require 15,000 trains of 20 cars each, or over 40 trains per day all the year round, including Sundays, and would then require 3,000 vessels of 2,000 tons each for further transportation."

The present cost of transporting wheat to the seaports at Montreal, Boston, or New York, from the centre of this region, is about 35 cents per bushel, whilst the same charge per mile to Port Churchill would not exceed 15 cents, and the saving in the carriage of live stock, as stated by Admiral Markham, would be fully equal to £3 per head.

One of the most important questions of the day is the importation of live stock into the United Kingdom. Here is a country capable of raising millions of heads of cattle, absolutely free from every kind of disease, owing to the remarkable healthiness of the climate; but the present export is prohibited, owing to their having to pass, for more than 1,000 miles, through the eastern portion of Canada, to a port of shipment. The opening of the Hudson's Bay route would remedy all this, and would enable the cattle to be shipped in prime condition at half the present cost by way of Montreal.

The Marquis of Dufferin and Ava, the Marquis of Lorne, Professor Fream, Mr. Van Horne, Mr. Rudyard Kipling, and many other eminent men have borne testimony, from personal knowledge, of the marvellous richness of the soil, and the healthiness of the climate of this great region. In an article, contributed to "The Times" on the 23rd of November last, Mr. Rudyard Kipling says: "People have no more than just begun to discover a place called Banff Hot Springs, two days west of Winnipeg. In a little time they will know half a dozen spots not a day's ride from Montreal, and it is along that line that money will be made. In those days, too, wheat will be grown for the English market four hundred miles north of the present fields on the west side, and British Columbia, perhaps the loveliest land in the world, except New Zealand, will have her own line of 6,000 ton steamers to Australia, and the British investor will no longer throw away his money on hellicat South American republics, or give it as a hostage to the States. He will keep it in the family, as a wise man should. Then the towns that are to-day only names in the wilderness, yes, and some of those places marked on the map as Hudson's Bay Posts, will be cities, because—but it is hopeless to make people understand that actually and indeed, we do possess an empire of which Canada is only a portion, an empire that has not yet been scratched."

To the North-West of the territories already described, there is a vast region, embracing the Athabasca and Great Mackenzie basins, on the resources of which a select committee of the Senate of the Dominion took evidence, and reported, in 1887 (see Appendix I), in which, amongst other things, the committee say: "That within the scope of the committee's inquiry, there is a possible area of 650,000 square miles fitted for the growth of potatoes, 407,000 square miles suitable for barley, and 316,000 suitable for wheat, that through this arable and pastural area latitude bears no direct relation to summer isotherms, the spring flowers and buds of deciduous trees appearing as early north of the Great Slave Lake (Lat. 63) as at Winnipeg, St. Paul, Minneapolis, Kingston, or Ottawa, and earlier along the Peace, Liard, and some minor affluents of the Great Mackenzie River, where the climate resembles that of Western Ontario. That on the head routes of the Peace, Liard and Peel Rivers, there are from 150,000 to 200,000 square miles, which may be considered auriferous.

"That the evidence submitted to the committee points to the existence, on the Athabasca and Mackenzie Valleys, of the most extensive petroleum field in America, if not the world. The uses of petroleum, and, consequently, the demand for it by all nations, are increasing at such a rapid rate that it is probable that this great petroleum field will assume an enormous value in the near future, and will reckon among the chief assets comprised in the Crown domain of the Dominion, and be shipped from Churchill, or some other northern port of Hudson's Bay, to England."

THE CONSTRUCTION OF THE RAILWAY.

It is proposed to divide the line into three sections. The first from Port Churchill to Sea Falls, 350 miles, where it would be joined by the line, at present under construction, from Winnipeg, thus giving a connection on the south with the City of Winnipeg, and with the North-Western States of the Union. This section will be first constructed. It has been surveyed by a competent engineer, Mr. Bayne (see Appendix B, Page 34), the levels taken, and presents no difficulty to the construction of a good line of railway at a moderate price. Timber and stone are in abundance for all requirements, the climate is said to be more favourable, and the rain less than at Winnipeg, and that work can be carried on during the whole of the winter.

The completion of this section will place Port Churchill in direct railway communication with the navigation of Lake Winnipeg and the Red Rver, passing the City of Winnipeg, and extending far into Minnesota and Dakota, and the Great Saskatchewan River, forming together a south and westward navigation for steamers, for a distance of about 1,800 miles.

Section two, from Sea Falls to Prince Albert, about 300 miles, runs through some of the richest wheat land in the North-West, and will form a connection at Prince Albert with the Regina branch of the Canadian Pacific. The country is exceedingly favourable for the cheap construction of the railway.

The third section, from Prince Albert via Battleford to Calgary, about 350 miles, runs through a fine prairie country, unequalled in North America for the raising of cattle and dairy produce, and will be a surface line easy and cheap in the cost of construction.

At Calgary, the railway will form a junction with the Canadian Pacific Railway, and by passing over that line to Vancouver, effect the enormous saving from ocean to ocean, as compared with the route viâ Montreal, of 1,328 miles.

It will also connect with the present branch line to Edmonton, and form the shortest route between the United Kingdom and the Athabasca River and Great Mackenzie Basin, which comprises the greatest petroleum deposit in America, and the rich agricultural and auriferous valleys of the Peace, Liard, and other rivers.

ESTIMATED TRAFFIC.

The steamers from the United Kingdom will carry at least two-thirds of the immigrants, which may be estimated at 20,000 annually, and all the railway material and the bulk of the manufactured goods imported into the North-West Territory, including through traffic to the Pacific.

The exports will consist of grain, live stock, dairy produce, hay, salmon, and other fish, and furs of the Hudson's Bay Company and other fur traders.

In addition to this, the line, by its great saving in time and distance, will command the carriage of a portion of the mails and through passengers to and from the Pacific.

The carriage of one half of the present produce of the North-West Territories, viâ Port Churchill, will be sufficient to tax to the fullest capacity the proposed railway.

APPENDIX A.

PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY.
OCTOBER 1881.

On the Commercial Importance of Hudson's Bay, with Remarks on Recent Surveys and Investigations.

By **Robert Bell**, M.D., F.G.S., Assistant Director of the Geological Survey of Canada.

I beg leave to offer to the Royal Geographical Society a few remarks on the great Mediterranean Sea of North America, in regard to which there appears to be a general want of correct information. Before proceeding to do so, it may be proper for me to state that I have a considerable personal knowledge of Hudson's Bay and the surrounding regions. As an officer of the Geological Survey of Canada, I have spent six seasons since 1869 in explorations around the bay itself or in its vicinity, while the remaining summers of this interval have been devoted mostly to surveying and exploring portions of the Hudson's Bay territory at greater or less distances inland. In the course of my geological investigations, I have made surveys of the most principal rivers, together with their larger branches, which flow from the west and south into Hudson's Bay, including the Great and Little Churchill, the Nelson, Hayes, Hill, Severn, Albany, Kenogami, Moose, Missinabe, Mattagami, and Abittibi. On account of its great geological interest, I made a topographical survey in 1877 of about 300 miles of the Eastmain Coast, from Cape Jones northward. Some of the maps showing these surveys have been already published with the annual reports of the Geological Department, and those representing the remainder will soon be forthcoming.

During the past autumn, in coming to England in one of the ships from the bay, I happened to enjoy unusually good opportunities of seeing both sides of Hudson's Straits, and of acquiring much valuable information in reference to its navigation.

In the popular mind, Hudson's Bay is apt to be associated with the polar regions, yet no part of it comes within the Arctic circle, and the southern extremity is south of the latitude of London. Few people have any adequate conception of the extent of this great American sea. Including its southern prolongation, James's Bay, it measures about 1,000 miles in length, and it is more than 600 miles in width at its northern part. Its total area is approximately 500,000 square miles, or upwards of half that of the Mediterranean Sea of the old world. It is inclosed by the land on all sides except the north-east, where it communicates by several channels with the outer ocean. The principal or best known of these is Hudson's Strait, which is about 500 miles in length, and has an average width of about 100 miles.

Hudson's Bay, which might have been more appropriately called Hudson's Sea, is the central basin of the drainage of North America. The limits of this basin extend to the centre of the Labrador peninsula, or some 500 miles inland on the east side, and to the Rocky Mountains, or a distance of 1,300 miles on the west. The Winnipeg Basin constitutes a sort of outlier of the region more immediately under notice, since the waters drain into it from north, south, east, and west, and discharge themselves by one great trunk, the Nelson River, into Hudson's Bay. The southernmost part of this basin, namely, the source of the Red River, extends down nearly to latitude 45°. The head waters of the southern rivers of James's Bay are not far to the north of Lake Huron; while one of the branches of the Albany rises within 25 miles of the north shore of Lake Superior. Including the Winnipeg system, the basin of Hudson's Bay has a width of about 2,100 miles from east to west, and a length of about 1,500 miles from north to south, and its dimensions approach the enormous area of 3,000,000 square miles. Over a great part of this vast region there is a temperate climate, and although much of the surface is comparatively barren, yet large tracts possess a very fertile soil. The numerous large rivers and lakes embraced within these limits will prove of great value in the settlement of the country.

Both the bay and straits are remarkably free from rocks and shoals which might interfere with their free navigation. The groups of islands near the east side of the bay are surrounded by deep water, and a wide channel leads up the centre of James's Bay. Fortunately the main body of the bay, which is the portion likely to be hereafter frequented by shipping, is entirely without shoals, reefs, or islands. The depth is very uniform over most of the bay, and nowhere does it present any great irregularities. It averages about 70 fathoms throughout, deepening to 100 and upwards in approaching the outlet of Hudson's Strait; while in the strait itself the soundings along the centre vary from about 150 to upwards of 300 fathoms. The bottom appears to consist almost everywhere of boulder clay and mud. Near the shores a stiff clay, affording good holding ground for anchors, is almost invariably met with on both sides.

James's Bay begins at Cape Jones on the east side, and Cape Henrietta Maria on the west, and runs south about 350 miles, with an average breadth of about 150 miles. The east side of Hudson's Bay, including its southern prolongation, is known as the Eastmain Coast. Between Cape Jones and Cape Dufferin on the Portland Promontory, and again in approaching Cape Wolstenholme, at the northern termination of this coast, the land is high and bold, some parts attaining an elevation of nearly 2,000 feet above the sea. The country on the south-west side of the main bay, as well as that lying to the west of James's Bay, is low and generally level, with shallow water extending a long distance out from shore. Both sides of Hudson's Strait are high and rocky, but the northern is less precipitous than the southern.

Of the numerous rivers which run into Hudson's Bay from all sides, about thirty are of considerable magnitude. All those which enter on the Eastmain Coast appear to flow with a uniform course directly west or parallel to one another, and as the height of land in the centre of the Labrador peninsula is furthest inland towards the south, the rivers which fall into the southern part of this coast are the largest, and the remainder become progressively smaller as we go north. Numerous streams converge to the head of James's Bay from all points southward of an east and west line passing through its southern extremity. The Moose, about a mile wide, is the principal of these. On the western side the Albany and the Churchill are the longest, but the Nelson, with a course of only about 400 miles, discharges the greatest body of water into the sea. Indeed, this great artery of the Winnipeg system may be considered as one of the first class rivers of the world. Few of the rivers of Hudson's Bay afford uninterrupted navigation for large vessels to any great distance from the coast. During the season of high water, shallow-draft steamers might ascend the Moose river and two of its branches for upwards of 100 miles. Hayes river and two of its branches might apparently be navigated by such craft in the spring to points about 140 miles inland, and the Albany for nearly 250 miles; while large steamers might ascend the Nelson for 70 or 80 miles from the open sea. The Nelson is the only muddy-water river entering Hudson's Bay. Most of the others have a slightly brownish tinge, but their waters are perfectly wholesome and contain only very small quantities of foreign matter. The Churchill, which is the second largest river of Hudson's Bay, is a beautiful clear-water stream, somewhat larger than the Rhine. It is remarkable for having at its mouth a splendid harbour with deep water and every natural convenience for the purposes of modern commerce.

The only harbours on the west side of Hudson's Bay are those formed by the mouths of rivers, but none of them, with the exception of Churchill Harbour, can be entered by vessels drawing more than ten or eleven feet, and only at high water even by these. The Churchill is unlike all the other rivers in having a deep, rocky, and comparatively narrow mouth, which can be entered with ease and safety by the largest ships at all stages of the tide. On the point at the west side of the entrance of the harbour stands the old Fort Prince of Wales, which is probably the largest ruin in North America. Although occupying a commanding position and mounting about forty large guns, it was surrendered, without firing a shot, to the French Admiral La Pérouse, who destroyed it in 1782.

Along the west coast the rise and fall at spring tides amounts to about 11 or 12 feet, on an average, and is pretty uniform, diminishing somewhat towards the south. It is greatest at the mouth of the Nelson river, where it amounts to about 15 feet. The tides are lower all along the east side of the bay. In Hudson's Strait there is a very good tide, amounting to 38½ feet at Fort Chimo, according to the reports we have received of Acting Staff-Commander J. G. Boulton's reconnaissance during the past summer.

Geologically the basin of Hudson's Bay, excluding the western or Winnipeg division, lies within the great Laurentian area of the Dominion. Silurian rocks resting almost horizontally upon these, form an irregular border along the south-western side of the bay, and in the valleys of some of the rivers they extend inland from 100 to 200 miles. To the south and west of James's Bay, the Silurian are overlaid by Devonian rocks, which here occupy a considerable area. The long chains of islands which fringe the east coast for nearly 300 miles to the northward of Cape Jones, and also the mainland in the vicinity of Richmond Gulf, are composed of igneous and almost unaltered sedimentary rocks, resembling the Nipigon series of the Lake Superior region, which may be of Cambrian age. On the western side of the bay, from Churchill northwards, quartzites and other rocks, which may also belong to the Cambrian system, appear to be largely developed. Valuable minerals may be looked for on this part of the coast. The extensive level region around the south-western side of the bay is overspread with a great sheet of boulder clay, which is generally covered by the modified drift. The rocks of the outlying, or Winnipeg division of the basin, comprise an extensive series, ranging from the Laurentian to the tertiary.

The resources of Hudson's Bay and the country immediately around it are varied and numerous, although as yet few of them are at all developed. The fur trade is the principal and best known business which has hitherto been carried on in these regions, but a large amount of oil, derived from the larger whales, the porpoises, walruses, white bears, and the various species of seals which frequent the northern parts of the bay, has been carried to New England, and small quantities, principally of porpoise and seal oil, have from time to time been brought to London by the Hudson's Bay Company. The other exports from the bay have been as yet but trifling. They embrace whalebone, feathers, quills, castorum, lead ore, sawn lumber, ivory, tallow, isinglass, and skins of seals and porpoises. The fisheries proper, speaking of Hudson's Bay, have not yet been investigated. Both the Indians and Eskimo find a variety of fish for their own use, and fine salmon abound in the rivers of Hudson's Strait; and from one or two of them a considerable number of barrels, in a salted condition, are exported every year. Waterfowl are very numerous on both sides of the bay, and larger game on the "barren grounds" in the northern parts, so that the natives, with prudence, may always have a plentiful supply of food.

But perhaps the most important of the undeveloped resources of the country around the bay are its soil, timber, and minerals. To the south and west of James's Bay, in the latitude of Devonshire and Cornwall, there is a large tract, in which much of the land is good and the climate sufficiently favourable for the successful prosecution of stock and dairy farming. A strip of country along the east side of James's Bay may also prove available for these purposes. To the south-west of the wide part of the bay the country is well wooded, and although little or no rock comes to the surface over an immense area, still neither the soil nor the climate are suitable for carrying on agriculture as a principal occupation until we have passed over more than half the distance to Lake Winnipeg. This region, however, offers no engineering difficulties to the construction of a railway from the sea-coast to the better country beyond, and this, at present, is the most important point in reference to it. Some of the timber found in the country which sends its waters into James's Bay, may prove to be of value for export. Among the kinds which it produces may be mentioned white, red, and pitch pine, black and white spruce, balsam, larch, white cedar, and white birch. The numerous rivers converging towards the head of James's Bay offer facilities for "driving" timber to points at which it may be shipped by seagoing vessels.

Minerals may, however, become in the future the greatest of the resources of Hudson's Bay. Little direct search has as yet been made for the valuable minerals of these regions. I have, however, found a large deposit of rich ironstone on the Mattagami river, inexhaustible supplies of good manganiferous iron ore on the islands near the Eastmain coast, and promising quantities of galena around Richmond Gulf and also near Little Whale River, where a small amount had previously been known to exist. I have likewise noted traces of gold, silver, molybdenum, and copper. Lignite is met with on the Missinabe, gypsum on the Moose, and petroleum-bearing limestone on the Abittibi river. Small quantities of anthracite, and various ornamental stones and rare minerals, have been met with in the course of my explorations. Soapstone is abundant not far from Mosquito Bay, on the east side, and iron pyrites between Churchill and Marble Island, on the west. Good building stones, clays, and limestones exist on both sides of the bay. A cargo of mica is said to have been taken from Chesterfield Inlet to New York, and valuable deposits of plumbago are reported to occur on the north side of Hudson's Strait. Some capitalists have applied to the Canadian Government for mining rights in the latter region.

Situated in the heart of North America, and possessing a seaport in the very centre of the continent, 1,500 miles nearer than Quebec to the fertile lands of the North-West Territories, Hudson's Bay now begins to possess a new interest, not only to the Canadians, but also to the people of Great Britain, from the fact that the future highway between the great North-West of the Dominion and Europe may pass through it. The possibility of this route being adopted for trade is not a new idea, as it has frequently been suggested by far-seeing men in past years, and occasionally referred to in the newspapers. In 1848, the then Lieutenant M. H. Synge, in his work on Canada, wrote: "A ship annually arrives at Fort York, for the service of the Hudson's Bay Company; who can tell how many may eventually do so?" In 1869, and subsequently, I frequently discussed the matter with the late Hon. John Young, Mr. Keefer, Professor Armstrong, and others; and in 1876, Mr. Selwyn brought the subject unofficially before members of the Canadian Government, and recommended that surveys be made of Hudson's Bay and Strait. The Right Hon. Sir

John A. Macdonald, Minister of the Interior, and his deputy, Colonel J. S. Dennis, have all along taken a deep interest in this question, and in 1878, the latter gentleman published a work, accompanied by a valuable map, in relation to it. The Report of the Minister of the Interior for 1878 contains an appendix by myself on the practicability of building a railway from Lake Winnipeg to Hudson's Bay. In the session of 1878-79, and again the following year, the Hon. Thomas Ryan, a gentleman of great enterprise, has brought the matter under the notice of the Dominion State.

In 1880 the Parliament of Canada granted charters to two companies for constructing railways, and otherwise opening a route for commerce, from the North-West Territories to Europe viâ Hudson's Bay; and during the past summer one of them, the Nelson Valley Company, caused a survey to be made of part of the distance between Lake Winnipeg and the harbour of Churchill. Their chief engineer has reported the route to be an easy and inexpensive one for a railway. This company had also the power of connecting with the Canadian Pacific Railway, but the main line will form a connecting link between the great system of inland navigation, with centres in Lake Winnipeg, and the sea. When constructed, the Nelson Valley Railway may carry to the seaboard not only the surplus grain and cattle of our own North-West, but also those of Minnesota and Dakota. Sir J. H. Lefroy, President of the Geographical Section of the British Association, in the able address which he delivered at the Swansea meeting (1880), said:—"Hudson's Bay itself cannot fail, at no distant day, to challenge more attention. Dr. Bell reports that the land is rising at the rate of five to ten feet in a century, that is, possibly, an inch a year. Not, however, on this account will the hydrographer notice it; but because the natural seaports of that vast interior, now thrown open to settlement, Keewatin, Manitoba, and other provinces unborn, must be sought there. York Factory, which is nearer Liverpool than New York, has been happily called by Professor H. Y. Hind, the Archangel of the West. The mouth of the Churchill, however, although somewhat further north, offers far superior natural advantages, and may more fitly challenge the title. It will, undoubtedly, be the future shipping port for the agricultural products of the vast North-West Territory, and the route by which emigrants will enter the country." Sir Henry Lefroy knows whereof he writes, being personally well acquainted with Hudson's Bay and the North-West Territories.

It has been shown that the Canadian North-West Territories, embracing hundreds of millions of acres of fine land, are capable of becoming the greatest wheat field in the world. The centre of this immense agricultural region lies to the north of the Saskatchewan. If we look at the map of the northern hemisphere, we shall see at a glance that the shortest route between these territories and England is through Hudson's Bay. Mr. Lindsay Russell, the Surveyor-General of Canada, has recently made a close calculation of relative distances, and found that even the city of Winnipeg, which is near the south-eastern extremity of these territories, is at least 800 miles nearer to Liverpool by the Hudson's Bay route than by the St. Lawrence, while the difference in favour of the former will be increased continually as we advance northward into the interior. Now let us consider the relative progress of two persons travelling to Liverpool from the centre of this vast region, the one going by Winnipeg and the valley of the St. Lawrence, and the other by the Nelson Valley and the Churchill Harbour. In about the same time which the former requires to reach the city of Winnipeg, the latter arrives at the sea-coast at Churchill. From Winnipeg our first traveller has still to go 1,291 miles by the Lake Superior route, or 1,698 miles if he prefers the all-rail journey through American territory, viâ Chicago, before he reaches Montreal, where he will be still about as far from Liverpool as our other traveller when he has reached Churchill. In other words, the route from the North-West territories to England, viâ Hudson's Bay, saves the whole distance between Winnipeg and Montreal. The distance to Liverpool by way of New York is still greater. The advantages of this short route over all others are so numerous that only a few of them can be referred to in this short paper. The great saving in distance represents an important economy in time and money, or in freight and passenger rates. If the grain, cattle, and other productions of the North-West Territories could reach a European market, only through Ontario and Quebec, or by way of New York, a large proportion of their value would necessarily be consumed by the long land carriage; whereas, if they find an outlet at Churchill, there will be an average saving of 1,291 miles as compared with Montreal, and of upwards of 1,700 miles as compared with New York, and this without any increase in the length of the sea voyage. In effect, this will place a great part of the farming lands of our North-West Territories in as good a position in regard to a seaport as are those of Ontario west of Toronto; and consequently will greatly increase the value of every description of farm produce, and, therefore, of the farms themselves. Some kinds, which could not be sent out of the country at all by the longer land route, may be profitably exported by the shorter one. For the transportation of both grain and fresh meat, as Colonel Dennis has pointed out, the northern route, besides the shortening of the distance, would have great advantages over all those to the south, owing to its cooler and more uniform temperature. Heavy or bulky goods of all kinds would, of course, be imported into the North-West by the shortest land route. In regard to the export and import of live stock, this independent route will possess a great importance to these territories. Hitherto cattle, horses, hogs, and sheep have there enjoyed an immunity from almost all forms of contagious diseases, and, owing to the healthy nature of the climate for these animals, it is hoped this state of things will continue. The domestic animals in the United States and the older Canadian provinces being occasionally afflicted with contagious diseases, it becomes necessary for European countries to impose restrictions on their importation. In the event of an epidemic of this nature existing in some part of these regions, but not in the North-West Territories, there need be no objection to exporting live stock from the latter by way of Hudson's Bay.

As a route for emigrants from Europe, that by Hudson's Bay possesses not only the advantage of the short land journey, but the still more important one to us, of entirely avoiding the United States and the populous parts of Canada, in both of which, it is well known, a very serious percentage of the immigrants destined for our North-West lands are every year enticed away to settle in the great republic. An inlet by Hudson's Bay is the only thoroughly independent channel which can ever be established between the British

Islands and our great and valuable territories in the interior of North America; and it is very desirable, on national grounds, that it should be opened up. Troops have hitherto been sent to the Red River settlement on more than one occasion, by way of Hudson's Bay, while the intervening country was, as it is yet, in a state of nature. Were a short railway built through this tract, it would at once become, for military purposes, an easy connecting link with the mother country.

An impression has long prevailed that Hudson's Bay and Strait could not be navigated for the ordinary purposes of commerce on account of ice, but this idea is probably destined to prove chimerical. The occasion for testing the point had not hitherto arisen, and the fact that these waters have been successfully navigated by ordinary sailing vessels for 200 years, in order to secure what little trade the country afforded, indicates what may be expected from properly equipped steamships, so soon as the larger business of the future may require their services in this direction. The conditions of the sea-borne commerce of the North-West, in relation to Hudson's Bay, will probably turn out to be similar to those of the rest of Canada with reference to the Gulf of St. Lawrence. In both cases, everything must be done during the summer. Yet Hudson's Bay is, of course, open all the year round. No one would be likely to suppose that a sea of such extent, in the latitude of the British Islands, would ever freeze across. The Lower St. Lawrence is also partly open even in the middle of winter. But the difficulty in both cases is the impossibility of getting into harbours. A harbour such as that of Churchill on Hudson's Bay would have the advantage over Quebec or Montreal of communicating directly with the open sea, and hence in the autumn, vessels would not be liable to be frozen in, as occasionally happens in the St. Lawrence, as for example in the autumn just passed; and also in the autumn of 1870, when the outward-bound shipping got frozen in below Quebec, occasioning a loss, it was said, of over a million of dollars. Again, in the spring there would probably be less uncertainty about entering from the sea than in the Gulf of St. Lawrence, where vexatious delays are not uncommon after the open season is supposed to have arrived.

There has been some discussion as to the length of time during which Hudson's Strait and Bay might be navigated each year, but there does not seem to be much evidence that the strait any more than the bay, is closed at any season. Its great width, depth, and the strength of the tides probably keep it open all winter. My own experience and that of many others lead me to believe that the climate generally of Hudson's Bay is much better than some writers have represented it to be. From all that I could learn or observe, it appears that the strait and bay may be navigated and the land approached by steamers during an average of four and a half months each year, or from the middle of June to the end of October. The strait and bay could probably be navigated by steam-vessels earlier than the middle of June, but nothing would be gained, except perhaps by whalers, in going in before an open harbour can be reached, Much has been recorded in favour of the above opinion from the days of the Danish Captain John Monck, who wintered at Churchill in 1619-20, to the present time; and other evidence, which is not to be found in the books, lead me to the same conclusions. Churchill Harbour does not freeze up until November, and the sea is open close to it during the whole winter.

I have a record of the principal phenomena of the seasons at Martin's Falls, on the Albany, extending through a period of fifty years, and from it I find that the river is open there on an average for six months of the year. I have also a record of dates of the opening and closing of Hayes River at York Factory, extending over more than fifty years, from which it appears to enjoy an average of fully six months of open water. The Nelson River is open for a longer period. I think, with these facts before us, we need not despair of successfully navigating Hudson's Bay, as far as the length of the season is concerned. Even were the time of open navigation shorter than it is known to be, the very great benefits which the North-West and Canada generally would derive from possessing an outlet in that direction, are sufficient to make it well worth an effort to open it. The freedom of Hudson's Strait and Bay from rocks, shoals, and other impediments to navigation will exempt vessels in that quarter of the globe from the heavy expenses for pilots, lighthouses, etc., which burden shipping by the St. Lawrence, and are even more onerous in some other parts of the world. The delays from drifting ice in the strait which have occasionally occurred to sailing vessels would not be experienced by steamships.

We have seen that in proportion as we decrease the cost of transportation to a foreign market, we increase the home value of all kinds of farm produce, and consequently of the farm itself. Now, considering the vast extent of fine land to be affected by the opening of the route above referred to, if the value of each acre of it were enhanced in this way by only a few shillings, the aggregate increase would amount to more than a hundred millions of dollars. Such a gain as this, together with the various other great advantages which, as we have seen, may be derived from the opening of this new ocean route, will, I think, sufficiently illustrate the commercial importance of Hudson's Bay.

APPENDIX B.

GEORGE A. BAYNE, Civil Engineer, Winnipeg.

Season 1884.

I was instructed by the directors of the Nelson Valley Railway Company to make an exploration survey of their proposed route from Winnipeg to the shores of the Hudson's Bay, at Fort Churchill. From Winnipeg northward to the mouth of the Red River, the country is thickly settled, the surface is level, and the soil a rich dark loam. From thence through the Icelandic reserve to the White Mud or Icelandic River, the country is undulating, and, as a whole, densely timbered with poplar and a small proportion of spruce. The agricultural resources of this country have not been thoroughly tested, but sufficient farming has been done to demonstrate that the land is of the best quality. From the White Mud River northward there is no settlement except at points along Lake Winnipeg, where timber limits are being worked. The land along this part of the route is similar to that on the Icelandic reserve, and quite as suitable for cultivation. There is abundance of timber in this section. The Little Saskatchewan is the first river crossing of any importance, but presents no unusual obstacle. The Big Saskatchewan crossing is of more importance, but nature has done much to favour the construction of a bridge at the Grand

Rapids, as the banks are high and steep, and composed of solid limestone, furnishing good material for the necessary piers and abutments, while the stream is narrowed by the presence of two islands in the channel. The crossing of this river will be an important point, as the intersection of the water transport of the Saskatchewan with the line of railway. It may eventually be considered advisable to run a short branch line from a point a few miles north of the crossing to the head of Cedar Lake, where boats are frequently windbound. From the Sebatchewan Rapids to Was-ka-owa-ka Lake, is the only rocky portion of the route. This section will require much more minute exploration than I was able to give it, before final location can be decided upon. The number of rivers to be crossed is greater than on the southern portion of the route, averaging one crossing to about every ten miles. The streams are, however, very small, the largest being the Burntwood River. This river forms the outlet for a chain of lakes lying parallel to the Nelson River, and a few miles to the westward of that stream. After crossing this river we strike across the height of land between the Nelson and Churchill Rivers, which can be surmounted by a grade of one foot in a hundred. The soil over this section is lighter than the southern. The water powers along the Nelson River and its tributaries are very numerous and unlimited in extent. From Was-ka-owa-ka Lake to Hudson's Bay, the cost of construction will probably be not more than on the southern end of the route. The soil for the first hundred miles is clay over gravel, and the surface is pretty level; the balance is a level mossy plain. The rivers to be crossed average about one to every twelve miles, most of them small. The lengths of the different divisions I estimate as follows:

Winnipeg to Saskatchewan Rapids	350 miles.
Saskatchewan Rapids to Was-ka-owa-ka Lake	213 „
Was-ka-owa-ka Lake to Hudson's Bay	152 „
Total length	715 miles.

I consider myself in saying that the length of the road will be lower rather than above this figure.

The harbour at Churchill is one of the finest I have ever seen. Nature has done so much for it in the way of protection from storm and in depth of water, that without farther improvements, it is fitted to take rank among first-class ocean ports. I took careful soundings, and find at a distance of 400 feet from high water mark along the shore, a depth of 38 feet deepening suddenly to 50 feet. These soundings were taken at extreme low tide. At spring tides the river rises at least 15 feet, so that it will be seen that the river affords from 53 to 65 feet of water. The entrance to the harbour I judge to be about half a mile in width, the point on the west side extending into the bay, and overlapping that on the east.

From reliable information I learned the following facts, viz.: 1st. The Bay and Harbour of Churchill are open for navigation from the 15th June to 20th October for ordinary sailing vessels, such as now trade to this port. 2nd. That sometimes the ice does not take fast in the harbour until the 1st December. 3rd. That the ice is never solid in the bay for a greater distance from the shore than half a mile, and this is liable to be broken up by wind and tide. 4th. That this harbour is considered by the coasters to be the best on Hudson's Bay.

From the above facts it will be seen that, so far as the harbour at Churchill is concerned, there will be found little difficulty that experience and practice will not overcome to prevent the loading and unloading of steamers all the winter.

APPENDIX D.

Mr. Charles N. Bell, in his "Northern Waters," 1884, says: "It is found on investigation that fully 750 vessels have passed through Hudson's Strait, and this does not cover, it is known, the whole number. The list includes British troopships, emigrant ships, war vessels of the English and French (some of them carrying 74 guns), as well as ships bound on voyages of discovery, trade and whaling. As early as 1619, Capt. John Munck was sent by the King of Denmark, and he wintered at Churchill, a brass gun of his being taken out of the river some time about the date of the appearance of Fox in that harbour."

Dr. Bell obtained from the company's offices, in London, a record, which, printed in his report, shows the date of arriving and sailing of their vessels at York Factory for 93 years, and at Moose Fort for 147 years. These lists show that in some years several vessels were sent in charge of British men-of-war, and there have been almost every year during the past two centuries, ships of various classes and sizes, navigating the strait without loss, and it seems almost incredible that such a number of voyages could be made, extending over 274 years, without the loss of over one, or, as is claimed by some writers, two small sailing vessels.

It is said that the two vessels lost were chartered ships of the Hudson's Bay Company, and they met with mishaps in the ice. They were the barque "Grahame," in 1852, and the barque "Kitty," about 1850. The latter foundered in the middle of the strait off Saddle Back Island.

APPENDIX E.

REPORT

Of the Select Committee of the House of Commons to inquire into the Navigation of Hudson's Bay.

House of Commons, Committee Room, 8th April, 1884.

The committee appointed to inquire into the question of the Navigation of Hudson's Bay beg to submit the following report:—

Hudson's Bay, situated between 51° and 63° of north latitude, is a vast sheet of salt water, measuring 1,300 miles in length, with an average width of about 600 miles. It occupies the centre of British North America, and drains a territory over three millions of square miles in superficial extent. From Labrador, in the east, and from the Rocky Mountains, in the west, numerous large rivers flow through Provinces, districts great as provinces, and vast solitudes into this inland sea; towards the south the extremity of its basin reaches to the sources of the Mississippi. The average depth of this Mediterranean of Canada is 70 fathoms, as stated by Lieut. Chappelle, R.N., and such is the uniformity of the bottom that Dr. Bell, of the Geological Survey, does not hesitate to assert that, if through any convulsion of nature the water were to retire, we should see an immense plateau similar to the prairies of the West. There are no rocks or dangerous places to impede navigation; the western shore is low, and affords but one well-sheltered, spacious, and perfectly safe harbour, Churchill, situated 200 miles from York Factory.

The temperature of the waters of Hudson's Bay in summer is some 14° higher than that of the waters of Lake Superior. Storms are very rare, and by no means formidable, and no icebergs are ever to be met with; fogs are of rare occurrence and short duration. The tide is first felt on the west shore; it runs down towards the south, and then up by the south, and then up by the east shore. Certain winds are, it is asserted by many persons, periodical.

Towards the south a deep opening of the land forms James's Bay, a kind of prolongation of Hudson's Bay, situated 281 miles from Lake Superior. Its greatest extent from north to south measure 360 miles; its average breadth is about 150 miles. The east coast is woody, and the west low and swampy.

The country east of Hudson's Bay is extremely rich in iron ore, according to Dr. Bell. Anthracite is also found there, and lignite in abundance on James's Bay.

The waters of Hudson's Bay reach the Atlantic by way of Hudson's Strait, an arm of the sea 500 miles in length, and with an average breadth of 100 miles. The chief outlet of the strait is only 45 miles wide, between Resolution Island and Button Island on the north coast of Labrador. The depth of the water is over 340 fathoms in the strait. The current is very rapid, and runs as high as six miles an hour. The tide rises from 30 to 40 feet. The coast is very high and bold, especially toward the north; the land in many places, as seen by navigators, attaining from 1,000 to 2,000 feet in height. Were it not for the presence of the Polar ice, which comes down from the Arctic seas by way of Fox's Strait, during the months of April, May, June, and July. Hudson's Strait would, it is admitted by all, be exceptionally safe, owing to the uniform great depth of water and the entire absence of reefs or dangerous islands. These masses of ice, when emerging from the strait, meet the icebergs from Davis's Strait and Baffin's Bay, and are thus retarded on their way to the ocean, and is the chief, if not the only obstacle, which impedes the navigation of the bay, and greatly curtails its duration. The Circumpolar charts, published by the Hydrographical Office of the United States Navy Department, show the existence of a current which passes round Greenland, and shows itself to the east of Davis's Strait, running towards Baffin's Bay, and then down the direction of Labrador, coming in contact, in its course, with the rush of waters of Hudson's Strait.

The Bay of Ungava, a sharp indentation of the Labrador coast, lies at the eastern side of Hudson's Strait. Salmon abound in all the estuaries, and it is known that the Hudson's Bay Company yearly export large quantities of frozen salmon to the English markets. The same company have a fort, Fort Chimo, where they carry on a porpoise fishery on a small scale.

The seas we have just described have never ceased to be frequented since they were discovered in 1610 by Henry Hudson. When in seach of a passage to China, Champlain, the illustrious founder of the City of Quebec, set out that same year (1610) and ascended the St. Maurice, in pursuit of the same end, but he was forced to turn back. He had no better success in a fresh attempt in 1613. Hudson was more highly favoured, and was the first to reach the bay, and gave his name to this great north sea of the old charts. In 1612 Button visited these same latitudes, and gave his name to the group of islands off the entrance of Hudson's Strait. In 1631 Fox made his way further towards the North-West, and entered one of the numerous arms of the sea which form the outlet of the Arctic waters. It is now known as Fox's Strait. The following year James ventured as far as the head of Hudson's Bay, and discovered the bay which bears his name. All these renowned navigators were searching for a North-West passage leading towards the Pacific Ocean and the Western lands, about which so many marvellous tales are told.

After the period of discoveries comes the history of the attempts made at various times by the merchants of England and of France to explore and take possession of the riches which were believed to be hidden in these new lands. In 1662 Desgroseillers is said to have sailed into these waters; Couture and Dequet took possession the following year in the name of the King of France in 1668; Radisson, a Frenchman, and Gillam, an Englishman, from New England, built a trading fort; and lastly, in 1670, came the first establishment of the Hudson's Bay Company. From this date until the Treaty of Utrecht, in 1713, the bay became the theatre of sanguinary conflicts. Many a hero there won fame for deeds renowned in story; the navies of England and France met in the field of many a fight, and the forts on the shore were time and again taken and retaken, so that Iberville, writing to the King, said to him, "Sire, je suis las de conquérir la Baie."

This obstinate struggle between two great nations for the possession of Hudson's Bay, and the adjoining countries, of which the future value was more than problematical, seems strange to us now. However, the Treaty of Utrecht confirmed, England is in possession of Hudson's Bay and the adjoining countries, and a gloomy silence fell once more upon those lands buried beneath the snows and ice of their land winters. The Hudson's Bay Company, armed with exclusive privileges, did not remain inactive; for we find that in 1749 the jealousy of English merchants caused an inquiry by the House of Commons into the condition of the territories watered by Hudson's Bay and into the trade there carried on. A special committee was appointed, which sat, examined several witnesses, and made a report which has continued to be a matter of lively interest even up to our day. With the ostensible object of inquiring as to the means of civilising those countries, the end, even then, sought was the abolition of the monopoly held by the powerful company. The latter was compelled to lay before the committee a statement of its affairs, which showed it to be in a most flourishing condition. The most striking result which seems to have followed this inquiry was the assistance given by the company to all the hardy explorers who strove then and since to discover the mysterious and undiscoverable North-West passage. As regards the object to which we are now interested, that inquiry furnishes us valuable information regarding the navigation of Hudson's Bay. Thus the company state that in 1719 and 1748 they had sent out two, three, and even four vessels a year; and yet there is no mention made of a single disaster or the slightest accident.

It would be curious to compare the inquiry, made nearly a century and a half ago, with some of the evidence collected at the present time by your committee. It would be observed, among other things, that the navigation of these unknown seas was then characterised as safe and comparatively easy. Now this facility of approach and this safety are confirmed in our time. And if the number of vessels sent by the company is less in our time, it is because since the establishment of a railway, in the south of Manitoba, it costs them less to export by the route a great portion of the goods that they formerly despatched by way of Moose or York Factory.

Besides, it is shown by the evidence annexed to this report that Hudson's Bay has for several years not been frequented only by vessels belonging to the company.

The hardy sailors of New England periodically betake themselves to the north part of the bay to carry on the whale fishery, usually wintering on Marble Island, and sailing back the following season with their vessels laden with rich booty. Mention is, in fact, made of an American who has established a port on Hudson's Strait. Fishermen from Dundee, Scotland, also visit Hudson's Bay.

It is well known that the question of navigating Hudson's Bay has suddenly acquired a new importance. It is ever the problem of finding a North-West passage, not this time in order to reach the China Sea, but to gain access to the immense harvests of wheat which await in the prairies of the West the European buyers.

Let us suppose, says one witness, the possibility of establishing a line steamship between Liverpool and Hudson's Bay port, which would carry freight at the same rate as the steamships between Montreal and Liverpool. Now the distance between Winnipeg and Montreal is about 1,400 miles, while it is more than 700 miles to York Factory. It costs 1½ cents per ton per mile to forward grain from St. Paul's to New York, which applies to the distance to be traversed between Winnipeg and Montreal to York Factory, say the half. If, now, the ton is reckoned as equal to 33 bushels, the difference in freight, in favour of the Hudson's Bay route, would be a saving of 32 cents per bushel, or, in other words, an additional profit of 6.49 dols. per acre, yielding an average of 20 bushels. Other calculations made a saving one-third the present cost of transport realised by the farmer of the West upon the opening of a channel of exportation by the Hudson's Bay. A large proportion of importation from Europe would take this road; the immigrants proceeding westward would see that they could shorten the annoyances, the delays, and the cost of a journey across the Continent by some 800 to 900 miles. The export of butchers' meat would alone furnish a considerable portion of the lading of

Hudson's Bay steamers; and many persons are of opinion that this route would command a considerable portion of the import and export trade of North-Western States of Union. We speak merely incidentally of the Hudson's Bay fisheries, and of the workings of the minerals, almost inexhaustible in their richness, which are to be found there. To sum up the whole, Hudson's Bay appears to us to be destined to perform the same service for the vast territories of the North-West which the Gulf of St. Lawrence does for the vast and fertile valley bearing the same name. Churchill is 2,926 miles from Liverpool, Montreal 2,990, viâ Cape Race and New York 3,040. There is, therefore, a difference of 64 miles over the route of Montreal, and 114 miles over that by New York, in favour of Churchill.

If we sum up the evidence gathered by the committee, as to the present condition of the navigation of Hudson's Bay and Strait, we find that the great majority of those who have been here, and consequently who know, reckon the duration of the navigation in these waters at three and four months. For more than 250 years sailors have counted upon having an uninterrupted navigation of two months and one-half to three months, and this without marine charts, without an accurate knowledge of these waters, without lighthouses, without a system of telegraphic communication, and without aid of steam. It is not, then, an unwarranted belief that, with all the appliances now at the disposal of nautical science, this navigation will be prolonged some weeks.

In 1716 Captain Vaunton wrote that of all known countries the navigation of the Gulf of St. Lawrence was the most difficult and the most treacherous. From 1684 to 1730 the wrecking of seven large vessels, belonging to the King, in the gulf was recorded. The loss of these vessels, loaded with merchandise of the most valuable description, several times caused the most extreme embarrassment to the colony. Of three expeditions fitted out by England, and sailing through the Gulf of St. Lawrence, only two were able to cast anchor in the harbour of Quebec. Everybody has heard of the disaster which overtook Walker's fleet in 1711.

Only one voyage each year was then made, and it was alleged that the St. Lawrence was frozen solid in winter.

What a contrast between the navigation of the St. Lawrence then and now! Owing to the intelligent and persevering efforts of the Government of Canada, magnificent harbours have been created; a powerful and numerous fleet takes its way every year in almost complete safety as far as Montreal, spreading everywhere energy and wealth; and the export alone of grain by the noble route reached the figures of 10,500,000 bushels in 1883.

To declare that it will be time enough to pay attention to the question of navigating Hudson's Bay when the railways become sufficient to move the traffic of the North-West, appears to us to be an erroneous view to take of the matter. What we have to do is to promote production by offering to it more favourable conditions.

There are also results, gathered from the evidence gathered by your committee, a necessity for the Government to examine a great number of questions intimately connected with the navigation of Hudson's Bay and Strait.

Without the intervention of the State this navigation will remain what it is at the present moment, uncertain, of short duration, without any attraction for capitalists. In this direction several have set forth their opinions as to the nature of the examination which the Government might have made, and as to the organisation and character of a proposed surveying and exploring expedition.

They almost all agree in stating that these observations should cover a period of at least three years, and should be conducted by means of observatories, erected on the shores of the strait as well as on certain places on the coast of Hudson's Bay.

Cape Wolstanholme, Nottingham Island, the neighbourhood of North Bay, Cape Hope, Resolution Island, and one of the Button Islands have been pointed out as localities which might be selected.

The meteorological and astronomical phenomena, the currents, the temperature of the waters, the tides, the movement and nature of the ice masses, some hydrographical bearings, etc., such would be, or nearly so, the work entrusted to the head men of the stations. The Government would succeed in this way in establishing a knowledge upon a number of essential points relating to the navigation of those unknown waters, and would prepare the way for capitalists desirous of essaying the opening of this grand road to the North-West.

The breaking up of these waters which fall into Hudson's Bay, as well as the date of the formation of the ice upon these rivers upon the beach of the bay, are, of course, the important facts which it is necessary to take into account, in order to determine the duration of navigation. From the tables given to the Government by the Hudson's Bay Company in 1880, it appears that the breaking up of Hayes River at York Factory for a period of 53 years took place on the average 15th of May. The mean of the formation of ice gives the 20th of November, which would give an average of about five months or thereabouts of navigation. We know that the 1st of May is the usual date of the opening of Montreal Harbour, and the 25th November of its closing. The point would be to ascertain for certain this fact, not only as to York Factory, but Churchill Harbour, and various other places on the shores of Hudson's Bay. The information hitherto collected only applies to a very small number of ports.

Your committee beg to submit with this report all the evidence taken in the course of investigation, some of which will be found of a most interesting character.

In concluding this report, your committee believe it to be their duty to remark upon the absolutely impartial character of their labours. Undertaken without reference to preconceived opinions, the inquiry has been conducted in a manner well calculated to throw the greatest possible amount of light upon the conditions and character of the navigation of this portion of our Marine Dominion. The information obtained cannot be said to complete the examination of the question; but your committee are satisfied if they have been able, by their efforts, to contribute to the critical examination and solution of a problem which will assure to Canada an immense development of its marine—the monopoly of the traffic of the North-West, and a fresh pledge of prosperity and grandeur. The whole of which is respectfully submitted.

(Signed) J. ROYAL, Chairman.

APPENDIX H.

Legislature Province of Manitoba, Session 1884.

The Hon. Mr. Brown, from the Committee on the Hudson's Bay Inquiry, in 1884, presented their Sixth Report, which was read as follows:—

Your committee beg leave to report that they have met eleven times, and have taken the evidence of the following witnesses, viz.:—

Mr. John Moyes, Winnipeg.
Mr. C. N. Bell, Winnipeg.
Mr. H. Johnston, Winnipeg.
Capt. W. Kennedy, Winnipeg.
Capt. J. Hackland, Headingly.
Mr. W. Stephenson, Headingly.
Capt. Colin Sinclair, St. Andrews.
Mr. D. MacArthur, Winnipeg.
Capt. H. Robinson, Winnipeg.
Mr. W. Archibald, Winnipeg.
Mr. W. Dickson, Lake Francis.
Mr. Jno. Hargraves, High Bluff.
Mr. C. S. Drummond, Winnipeg.
Ven. Archdeacon Cowley, Dynevor.
James Ward, St. Anne's.
Geo. A. Bayne, C.E., Winnipeg.

And have received written testimony from many others.

Many of the gentlemen examined have had personal and extended experience as officers and servants of the Hudson's Bay Company at their posts on Hudson's and Ungava Bays and the rivers emptying into those bays.

No evidence has been given that goes to prove that Hudson's Strait and Bay proper ever freeze over, or that the ice met with in those waters is sufficient to prevent navigation at any time of the year.

That, consequently, the period of navigation is defined by the time during which the ports, harbours, or roadsteads on the shores of the bay can be entered by vessels of a suitable description for such navigation.

That, from the evidence adduced, it appears that such ports or harbours are open on an average, from four and a half to five months in each year to ordinary vessels.

That Hudson's Bay and Strait appear, from all evidence taken, to be singularly free from obstruction to navigation in the shape of shoals or reefs; and, during the period of open water, from storms or fogs.

That, while in the opinion of your committee, sufficient evidence exists to prove the practicability of a route of communication with this Province viâ Hudson's Bay, your committee is glad to perceive that it is the intention of the Dominion Government to send an expedition to examine into the general question of the navigation of Hudson's Bay and Strait, and to obtain such information as will enable correct charts of the coasts and harbours to be constructed.

That, considering the paramount importance to this Province of such an investigation, your committee advise that steps be taken by your Honourable House to secure a proper representation of this Province upon such expedition.

Your committee has also examined many persons familiar with the country between this Province and Hudson's Bay, and has examined the reports of engineers and others, charged with the duty of making technical explorations of such country, and are of the opinion that no engineering difficulties exist which will prevent the construction of a line or lines from this Province to the shores of Hudson's Bay.

Your committee begs to draw the attention of your Honourable House to the immense commercial importance to this Province of the proposed route of communication, whether by rail and water, or by rail alone. They find that the area under cultivation in the states of Minnesota and Dakota, and in this Province, in 1882-3, aggregated nearly 9,000,000 of acres, which produced a crop of all kinds of grain amounting to upwards of 80,000,000 bushels. One railway alone (the St. Paul, Minn., Manitoba R.R.) carried southward 13,087,120 bushels of wheat, 370,010 barrels of flour, during the year ending the 30th June, 1883, and it is safe to assume that had the outlet viâ Hudson's Bay existed, at least one-half of this produce would have followed that channel to the seaboard.

Your committee feels justified in assuming that this route would be extensively availed of by the shippers of this country and the neighbouring States of America in consequence of the fact that the distance from Winnipeg to Liverpool viâ Hudson's Bay is 570 miles less than from Winnipeg to Liverpool viâ Montreal and the Straits of Belle Isle, and

770 miles nearer than viâ Montreal and Cape Race, while it is 1,051 miles nearer than by way of New York. By sea, Churchill Harbour is 64 miles nearer to Liverpool than is Montreal, and 114 miles nearer than New York.

Not only is the all rail route much shorter than by any other line, but Nature has provided water ways from the head of navigation of the Red River to the foot of Lake Winnipeg, which can be utilised for over six months in each year, thus reducing the length of railway line to be traversed to within 400 miles, or a less distance than from Winnipeg to Port Arthur.

Your committee has, therefore, no reason to doubt that a railway from thence to Hudson's Bay will prove a successful and remunerative undertaking; and are satisfied that such an outlet will do more to stimulate production in this Province and the North-West generally than any other enterprise.

Your committee has embodied in the appendix to this report, such economic and commercial statistics as are available, as proofs of the practicability and advisability of establishing communications with this Province viâ Hudson's Bay.

Ordered,—That the report be now received.

APPENDIX G.

PROCEEDINGS OF THE ROYAL GEOGRAPHICAL SOCIETY.

Hudson's Bay and Hudson's Strait as a Navigable Channel.

BY COMMODORE A. H. MARKHAM, R.N.

Read at the Evening Meeting, June 11th, 1888.

The question of the practicability of navigating Hudson's Strait in safety during a certain period of the year has lately excited much interest on both sides of the Atlantic, for reasons apart from geography. At the same time it is a question which is of considerable geographical interest, in connection with the movements of the ice in that region. The knowledge I have acquired of that part of the world is due to a careful study of the writings of our old navigators, and also of more recent reports, and this has been supplemented by the experience I gained during a voyage on board the "Alert," through Hudson's Strait to York Factory, on the western shore of Hudson's Bay, in the summer of 1886.

I have thought that a paper containing a condensed narrative of former voyages from the time of Sebastian Cabot, and an account of my own observations, would be useful to the Fellows of this Society for reference, if published in our "Proceedings." I therefore prepared a monograph of this kind, which has been accepted by the Council for printing, but which would be too long for reading at one of our evening meetings. What I now propose to submit to the meeting is a condensed version of parts of the historical section of my paper, followed by a fuller narrative of my own experiences.

Hudson's Bay, or, as it has not been inaptly termed, the Mediterranean Sea of North America, is a large inland sea, situated between the parallels of 51° and 64° N. lat., and, therefore, well outside the Arctic zone, and between the meridians of 78° and 95° W. long. It is about 900 miles in length from north to south, and some 600 wide, covering an area of something like 500,000 square miles.

Hudson's Bay is reported to be remarkably free from rocks and shoals, and it has an average depth of about 70 fathoms. So uniform are the soundings, that our accomplished associate, Dr. Bell, of the Geological Survey of Canada, in a paper which he communicated to our Society in October 1881, on the commercial importance of Hudson's Bay, had no hesitation in saying that if, through any convulsion of nature, this vast basin was to be drained of its water, we should find an immense plateau similar to the prairies of the West.

I would observe that there are few authorities on this subject whose opinions should be received with greater respect than those of Dr. Bell, who has devoted many years of his life to the exploration of Hudson's Bay, and whose knowledge and experience regarding the physical geography and geology of that part of the world are so well known.

The same authority states that storms in the bay are very rare and by no means formidable, that icebergs are never seen, and that fogs, the most dreaded enemy with which a sailor has to contend, are of rare occurrence and of but short duration. The climate of the shores of Hudson's Bay, during the summer months, is mild and genial, and many European vegetables, such as potatoes, lettuce, beet-root, and onions are grown in the open air. The winters are, however, very severe.

It is asserted that the temperature of the water in Hudson's Bay is no less than 14° higher than the water of Lake Superior, and in support of this assertion Lieutenant Gordon (who was sent by the Canadian Government in command of the recent expeditions despatched to Hudson's Bay for the purpose of reporting on its feasibility as a commercial route) writes, in his first official despatch, that "Hudson's Bay may therefore be regarded as a vast basin of comparatively warm water, the effect of which must be to ameliorate the winter climate to the south and east of it."

The principal, and, so far as we know at present, the only practicable approach to Hudson's Bay in a ship is through Hudson's Strait, a deep channel about 500 miles in length, which separates Labrador from the islands of Arctic America. The strait has an average breadth of about 100 miles, but the width in the narrowest part of the channel is not more than 45 miles. The soundings in the strait vary from 150 to 300 fathoms, and it is wonderfully free from shoals and rocks, or any other obstacles that would tend to make the navigation of a narrow channel more than ordinarily dangerous.

The accounts of early voyages to Hudson's Strait are important to us, because they form cumulative evidence respecting its navigability in the months when such voyages were undertaken. John Davis, when he was returning from the extreme northern point he reached in 1587, passed across the mouth of the strait on the 1st August, and thus remarked upon it: "This inlet or gulfe we passed over: where, to our great admiration, we saw the sea falling down into the gulfe with a mighty overfal and roring, and with divers circular motions like whirlepooles, in such sort as forcible streames passe thorow the arches of bridges." On the Molyneux Globe of 1593 (now the property of the Benchers of the Middle Temple, and which was lent to this Society for the Exhibition of Educational Appliances) the very words of Davis are written at the entrance of Hudson's Strait, namely, "Furious Overfall."

This is one out of several proofs that Davis had a hand in the construction of that famous globe. In 1602 Captain

Waymouth, during a voyage, organised by the East India Company, reported that he entered an inlet in the same latitude.

Hence it is that Captain Luke Fox, who subsequently made a voyage into Hudson's Bay, recorded the very true and apposite remark that "these two—Davis and Waymouth—did, I conceive, light Hudson into his straights."

In 1610 Henry Hudson was despatched in the little "Discovery," of 55 tons, with a crew of 21 men, to find the North-West Passage by way of the opening discovered by Davis, and marked on the Molyneux Globe as the "Furious Overfall." The labours of Hudson bore rich fruit, and he deserves a high place among our early geographers. His name is never likely to be forgotten: it is borne by the strait and by the great bay to which it leads. It is inscribed on the vast territory between that bay and the Pacific Ocean. It is affectionately remembered by the thousands of happy families now living on the banks of that beautiful river, which he found scantily inhabited by savage tribes. It was Hudson who opened to his own countrymen the fisheries of Spitzbergen and the fur trade of the Hudson's Bay Territory. The Dutch owed to him their North American colony, which afterwards became the English colony of New York. He thus built up to himself a far more enduring monument than his fondest dreams could have anticipated. His successes may well be held out as an encouragement to those who, like him, labour earnestly and steadfastly in some great cause which may seem almost hopeless.

Henry Hudson entered the strait which bears his name in the end of June 1610, and was at first much troubled by the amount of ice he encountered. For some time he experienced difficulty in making his way to the westward; and on the 11th of July, fearing the approach of a storm, he anchored under the shelter of three rocky islands to which he gave the name of "the Isles of God's Mercy." They are marked on our present charts as the "Middle Savage Islands." Thence he pushed his way westward to the Digges Islands and Cape Wolstenholme, at the entrance of Hudson's Bay, but, unfortunately, this is the last recorded incident in his journal. For an account of the remainder of the voyage we have to trust to the narrative written by one of the survivors, which, although of thrilling interest, contains little geographical information. The story of his wintering, of the mutinous conduct of the crew, and of the abandonment of Hudson and his son in an open boat, is told by this survivor, named Habakuk Prickett. The "Discovery" returned through Hudson's Strait early in the August of 1611 without any difficulty, and the reports of the survivors led to the despatch of another expedition in the ensuing year.

Sir Thomas Button, who commanded the expedition of 1612, in the "Resolution," proceeded through the strait in June, and reached Digges Island without much hindrance from the ice. He wintered on the west coast of Hudson's Bay, and returned through the strait in the summer of 1613 without any difficulty whatever. But, instead of emerging from the main entrance of the strait, Sir Thomas Button took his ship between the island on which Cape Chidley is situated, and the main land of Labrador. This channel has recently been named M'Lelan Strait, after the Canadian Minister of Marine and Fisheries, under the impression that it is a new discovery. "Resolution" Island is the name of the island on the north side of the entrance to Hudson's Strait. If the island on the south side, on which Cape Chidley is situated, was called "Discovery" Island, we should then have the two portals of the strait named after the two first ships that ever passed a winter in Hudson's Bay.

The enterprising company of merchant adventurers was not discouraged by the failures of Hudson and Button. In 1615 they again despatched the little "Discovery," under the command of Robert Bylot, with that accomplished navigator, William Baffin, as pilot. During this voyage, Hudson's Strait was entered towards the end of May, and on the 8th of June the Savage Islands were reached and named. Proceeding westward along the northern shore, the "Discovery" stopped at a place called Broken Point. The spot is memorable, because here the first lunar observation ever observed by an Englishman, for finding the longitude, was taken by William Baffin. This admirable pilot drew a most interesting chart, on which the coast-line and prominent headlands and islands are delineated, with a fair approach to accuracy. There were some delays in passing through the strait, owing to loose ice, but they were clear of it by the 1st of July. On her return in August the "Discovery" passed through the strait without encountering any obstacle whatever. But the great mistake made by Baffin, and, indeed, by all the old Arctic navigators, was that they relinquished exploration too early in the season.

In 1619 Captain Hawkridge sailed through the strait; and in the same year a Danish expedition, under Munk, also entered the bay, neither commander encountering any serious obstacle. Twelve years afterwards two vessels were fitted out, one at London, the other at Bristol, under the commands of Captain Luke Fox and James respectively, which entered Hudson's Bay.

Captain Fox was a quaint and witty writer, as well as a bold seaman. His description of the ice he met with in Hudson's Strait is so good, and so exactly coincides with my own experience of the ice in that locality, that it will be well to quote it. He says: "The ice in the strait consists of two kinds, one of which is mountainous (a huge piece, compact, of great quantity, some more, some less), but in this freet" (as he calls the strait) "you seldom have any bigger than a great church, and most thereof lesse." This description, of course, has reference to the icebergs met with at the entrance and in the eastern part of Hudson's Strait. He then describes the floe or pack ice as follows: "The other kind is smaller, and is what we call masht or fleacht ice. Of this you shall there have numbers infinite, some of the quantity of a roode, some a perch, some an acre or two acres. But the most is small and about a foot or two above water, and eight or ten under water, and these are they which do enclose you; so as in much wind, from the topmast head, you shall hardly see any water for them. But while you lie amongst them it is so smooth as you shall not feel the ship stirre." It would not be possible to give a more accurate account of the conditions of the ice in Hudson's Strait at the present day, than is furnished by this description written by Captain Luke Fox more than 250 years ago. It exactly describes the peculiar nature of the ice that is usually met with during the navigable season in this channel, and which I have not observed in any other part of the northern regions. Fox found little difficulty in passing through the strait, and was in Hudson's Bay by the 21st of July. His return voyage, during October, was still more easy, for he encountered no obstacle whatever, and was off Resolution Island on the 31st of October. Captain James, whose voyage was undertaken in the same year, 1631, reached the entrance of Hudson's Strait on the 24th of June, but was delayed in consequence of striking on a rock, and did not complete the passage of the strait until the middle of July. James wintered in the southern extremity of Hudson's Bay, and in 1632 he again passed through the strait, on his way home, without any difficulty whatever.

No further attempt was made to visit these seas, until a charter was granted to Prince Rupert and some enterprising merchants in 1669, and the Hudson's Bay Company was founded. Captain Gillam, in the "Nonsuch," was then sent out. He passed through Hudson's Strait without difficulty, and established a settlement near James's winter quarters, which he called Fort Charles. He returned the following year.

From this date, for a period of fifty years, no interest appears to have been taken in geographical research in the Hudson's Bay region; although the company's ships were frequently engaged in making the voyage from and to England. But at last two ships were fitted out by the Hudson's Bay Company for purposes of discovery, commanded by Captains Barlow and Vaughan; they were accompanied by Mr. Knight, an official of the Hudson's Bay Company, who had suggested the voyage, and who was nearly 80 years of age. They sailed from Gravesend in 1719, but three years elapsed without any tidings of them being received. A ship called the "Whalebone" was sent from Churchill in search of them, under the command of Captain John Scroggs, in June 1722, but without result. It was not until the year 1767 that the melancholy fate of the missing ships was ascertained by some of the company's boats engaged in the whale fishery. The ships had been wrecked on Marble Island, and the crews had perished after reaching the shore.

The next important expedition was that commanded by Captain Middleton, which left England in 1741; and this was followed by another, under Captain Moor, in 1746. Middleton passed through Hudson's Strait without difficulty; and although Moor was baffled by pack ice for several days, he succeeded in making the passage early in the season. Mr. Wales, who was sent out by the Royal Society in 1768, also passed the strait with ease. In fact, he was only nine days in going through, during which time he met with no ice to interfere with the progress of his ship, although he was delayed by contrary winds and calms.

During the whole of the eighteenth century vessels belonging to the Hudson's Bay Company made annual voyages to, and from, England to York and Moose Factories. They very rarely failed to make the voyage, and few of the ships were lost. One of the masters in the company's service, Captain Coats, who had been many years employed in navigating those seas, wrote a practical and very interesting treatise in 1750, which he named "The Geography of Hudson's Bay." It has been printed for the Hakluyt Society, and was edited by our associate, Mr. John Barrow.

An expedition of discovery, sent out at the instance of the Hudson's Bay Company in 1791, under Captain Duncan, forms an exception as regards the easy navigation of the strait. The vessel encountered much ice, which so delayed her that it was not until the 5th of September that Captain Duncan reached Fort Churchill.

We now come to the expeditions of Sir Edward Parry in 1821-23, of Captain Lyon in 1824, and of Sir George Back in 1836. The events of these memorable voyages are well known, and are, indeed, matters of history. Parry encountered much ice at the entrance of Hudson's Strait on the outward voyage, and nearly the whole month of July was occupied in getting through it. But the delay was occasioned as much by adverse winds and calms, as by the ice. On July 21st Parry wrote: "Bodies of ice became less and less numerous as we advanced up the strait from Resolution Island, and no ice was seen after we had proceeded a few leagues beyond the Upper Savage Islands." On the 25th he reported "the sea almost free from ice"; and on the 27th and 28th "ice in great quantities, but the pieces so loose as easily to allow the passage of a ship with a free wind. This ice was so honeycombed and rotten that it appeared in a fair way of being entirely dissolved in the course of a few weeks." This was, in all probability, ice that had drifted down through Fox's Channel. The weather was on the whole fine and clear, only four foggy days being recorded during the month of July.

During the return voyage, in September 1823, Parry was only five days passing through the strait, during which time no ice whatever was to be seen.

Regarding the best time for navigating the strait, Sir Edward Parry says: "Long experience has brought those who frequent this navigation to the conclusion that, in most seasons, no advantage is to be gained by attempting to enter Hudson's Strait earlier than the first week in July. The annual disruption of the ice, which occupies the upper and middle parts of the strait, is supposed not to take place till about this time. In the course of one single year's experience in these parts, we have seen nothing to recommend a practice different from that at present pursued by the ships of the Hudson's Bay Company."

I heartily concur with every word in this quotation, for it exactly corresponds with my own experience. But the fact must not be overlooked, that this advice is addressed to those who attempt the navigation of the strait in sailing ships. Steam has made a great revolution in ice navigation. A well-found steamer is able to make her way with ease through the ice in Hudson's Strait in June and July, when a sailing ship would be hopelessly beset, and incapable of pushing on. With regard to the practice pursued by the ships of the Hudson's Bay Company, alluded to by Sir Edward Parry, it stands to reason that the captains of those ships would naturally delay their passage across the Atlantic, so as not to reach the strait before July or August; for they were well aware that every extra day spent on the passage was a day nearer the disruption of the ice. Their experience told them that a policy of waiting was the wisest, when the chances would be more in their favour of getting through without hindrance from the ice.

In 1824 Captain Lyon, in the "Griper," passed through the strait in fourteen days, namely from the 6th to the 20th of August. He sighted some loose heavy ice off Resolution Island, but otherwise experienced no difficulty in getting through. On his homeward voyage no ice whatever was seen in the strait, and he averaged, in his dull old bluff-bowed sailing ship, 150 knots a day, as he passed through, from Cape Wolstenholme to Resolution Island.

During Sir George Back's memorable and eventful voyage in the "Terror," in 1836, he encountered much ice in the strait. But this appears to have been an exceptionally bad ice year. Still he was not more than a fortnight in getting through, namely from the 1st of August, when he was of Resolution Island, to the 14th, when he passed Nottingham Island. His course was then directed up Fox's Channel, where his ship was closely beset by heavy ice, in which, helplessly drifting at the mercy of the winds and currents, he was compelled to pass the winter. During a period of six months the ship drifted 234 miles in a generally south-east direction.

It is almost impossible for us to conceive, much less to describe, the anxiety that must have been experienced on board the "Terror" during those long dark months, when officers and crew were, it may truly be said, momentarily expecting the destruction of their floating home. She was most miraculously preserved, in spite of the terrible injuries inflicted on her by the ice, and she succeeded in making one of the most marvellous voyages on record across the Atlantic. The objects of Sir George Back's voyage were unfortunately frustrated by the ice in Frozen Strait. But although the amount of geographical information obtained was not very great, yet the voyage was exceedingly instructive, as showing the general drift of the ice down Fox's Channel and Hudson's Strait.

The account of the "Terror's" voyage home embraces one of the most thrilling stories of sea adventure that has ever delighted the readers of this country. When all hope of saving the ship and the lives of the crew had almost died out in the breast of the captain, the coast of Ireland was sighted; Captain Back then succeeded in running the "Terror" on shore off Buncrana, in Lough Swilly. The men were harassed and nearly worn out by their exertions in keeping the ship afloat; and the vessel herself, leaking like a sieve from the injuries she had received in the ice, was only held together by the stream cable being passed round the after part, and so binding her timbers and planking.

This was the last Government expedition, having geographical research solely for its object, that entered Hudson's Bay. But its waters have been navigated by the ships of the Hudson's Bay Company year after year. These vessels were annually despatched from England for York and Moose Factories, sometimes two, and even three being sent in a year. They rarely failed to reach their destinations, for, arranging, as they usually did, to reach Hudson's Strait, on their outward voyage, in about the first week of August, they experienced but little difficulty from the ice. On their return voyages in September and October, they always found the strait comparatively clear.

I have in my possession an official record of the voyages, out and home, of the Hudson's Bay Company's ship "Prince Rupert" for a period of eleven consecutive years, namely, from 1835 to 1846 inclusive. I find that the average time of getting through the strait, on the outward voyages during this period (and it must not be forgotten that the strait is 500 miles in length), was 16 days. The longest time was 31 days, when there was probably an exceptionally bad ice year. The shortest time was eight days. But the delays in getting through the strait were invariably caused by calms and adverse winds, and not by the ice. On the homeward passages no difficulties were met with from ice in the strait, and the vessel usually reached London in about five weeks after leaving York Factory. The earliest date for sailing from York Factory was the 6th of September, and the latest the 3rd of October. In the latter case the "Prince Rupert" was 38 days on the passage to London; so that it is impossible she could have had any serious detention from ice in the strait.

It must be remembered that this vessel, and all others then employed by the Hudson's Bay Company, were sailing ships, dependent entirely on sails for their motive power. Without wind they were helpless; with a foul wind their progress was of course proportionately slow. Wind, therefore, was a matter of the first importance in those days, when a vessel was endeavouring to make way through floes of loose ice; for when the wind falls, the ice invariably loosens, or, as the technical expression is, "goes aboard." But, under such circumstances, the unfortunate sailing vessel, being deprived of its only propelling force, is unable to take advantage of the ice being loose to push on. On the other hand, when a breeze springs up, which on ordinary occasions would possibly enable her to make good way, the wind has the effect of packing the ice, thus rendering progress nearly impossible.

Steam has now, however, effected a complete revolution in ice navigation, and the most advantageous time for pushing on is, of course, in calm weather, when the ice is loose. Under similar conditions a sailing vessel would be utterly hopeless. It is, therefore, only reasonable to infer that what has been performed regularly, and year after year, by sailing ships, can be accomplished with greater regularity and certainty by well-found steamers, specially constructed for ice navigation, and provided with powerful machinery. A channel which has been navigated for 270 years, first by the frail little fly-boats of the seventeenth century, then by the bluff-bowed, slow-sailing, exploring vessels of Parry's days, and for a long period by the Hudson's Bay Company's ships, cannot be very formidable; and if sailing ships can annually pass through it, *à fortiori* steamers will find less difficulty in doing so. But it would, of course, be necessary that such steamers should be specially built and equipped for the service, and it is desirable that despatch should be used in making the voyage.

The nature and consistency of the ice in Hudson's Strait are such that, with an efficient steamer, the passage could be accomplished with very little delay or difficulty. This being the case, it is not surprising to hear that the people of the North-West are anxious to have a seaport on the shores of Hudson's Bay, and to secure the construction of a railroad to connect such a port with Winnipeg, or some other equally convenient depôt on the newly-established line of the Canada and Pacific railroad.

The achievement of such an undertaking would result in shortening the distance that the produce of the country, destined for exportation, would have to be transported by one-half. As the cost of transport by rail is governed by the distance to be conveyed per mile, it will at once be understood that if the mileage is reduced by one-half, the cost of conveyance will be diminished in the same proportion. It has been estimated that the result of the construction of a railroad from Winnipeg to Hudson's Bay, would be a clear gain to the farmers and producers of the North-West, of about £3 per head on all cattle exported, and 5s. upon every quarter of grain sent for shipment.

The only obstacle to the establishment of the desired port, and to the opening of this route, is the belief in the formidable character of the ice that, we are told, would have to be encountered in Hudson's Strait, and the consequent limited duration of the navigable season.

There has been great controversy on this question. The advocates of the route maintain that the ice offers no obstacle which may not be overcome. Monopolists, and persons interested in other routes, represent the difficulties offered by the ice in Hudson's Strait as fatal to the success of the project. The question is a purely geographical one, its solution depends on physical considerations, and the controversy is therefore a clear gain to the science of geography.

In order to obtain full and accurate information on the questions involved in the discussion, the Government of Canada, with commendable energy and a praiseworthy determination to solve the long-disputed problem as to the practicability of navigating the strait annually, came to the resolution of despatching a vessel for the purpose of establishing stations on both sides of Hudson's Strait, at which continuous daily observations could be taken and recorded on the weather, tide, temperature, condition and movements of the ice, and other facts connected with the meteorology of that region, for a period of at least twelve consecutive months. A steamer called the "Neptune," which had been built for and employed in the sealing trade, was chartered and despatched in the year 1884 to perform this service.

The "Neptune" was in every way admirably adapted for the work she was required to perform, having been specially constructed for ice navigation. Her voyage was eminently successful. She experienced little difficulty in passing through Hudson's Strait, and succeeded in establishing stations at the following places. One, named Port Burwell, near Ungava Bay, on the south side of the strait, close to the entrance. Another in the vicinity of the Upper Savage Islands, at Ashe Inlet. Another was immediately opposite, on the south side of the strait (Stupart Bay). The fourth station was on Nottingham Island, and the fifth was established on Digges Island, at the opening into Hudson's Bay. An observer, with a couple of attendants, was placed in charge of each of these stations, with a supply of provisions to last over twelve months.

In the official report of the voyage of the "Neptune" whilst engaged on this service, her commander states that had he been making the passage direct to Churchill, instead of coasting and visiting specially selected places on both sides of the strait, he would not have been delayed by ice for more than about 48 hours. On the homeward voyage down the strait there was no check whatever, no ice having been encountered. The "Neptune" can, I believe, fairly lay claim to the honour of having been the first steam vessel that has ever crossed the waters of Hudson's Bay.

On the return of the "Neptune" to Halifax, steps were immediately taken to secure the despatch of a vessel to Hudson's Strait in the following year, for the purpose of visiting and relieving the stations established there.

In order to assist the Canadian Government in their praiseworthy endeavours to obtain reliable and accurate information regarding the navigation of the strait, the English Government placed H.M.S. "Alert" (a vessel which had already gained for herself a reputation in Arctic research) at their disposal. She was officered and manned by the Canadian Government, sailed from Halifax, and reached the entrance to Hudson's Strait on the 16th of June, 1885. But through some mismanagement, or want of experience in ice navigation on the part of those who were occasionally entrusted with the charge of the ship, she was allowed to be beset by the ice. No advantage appears to have been taken of her steam power to extricate her. In fact, the reverse seems to have been the case, for in the official report of this voyage we read that, instead of utilising the power that was at their disposal to release her from her imprisonment, they "banked the fires and left the ship to pull under a fore-topsail and fore-topmast staysail."

The "pull," however, does not appear to have been in the desired direction, or, if so, it was misapplied; for we learn that shortly afterwards the stem of the ship was so seriously injured by coming into contact with the ice, that it was considered not only desirable, but necessary to return to the southward, and they put into St. John's (Newfoundland) in order to effect the necessary repairs. The repairs were, however, easily and speedily executed, and by the first week in August the "Alert" was again in Hudson's Strait. The next few days were employed in visiting the stations established during the previous year, which was done without much difficulty, and on the 31st of the same month the "Alert" reached Port Churchill, having spent a few days at each station. When her duties were completed she sailed for Halifax, meeting no ice whatever during the return journey, although it was the 7th of October before she was clear of the strait.

The reports obtained from different stations regarding the presence and conditions of the ice in the strait, supplemented as they were by those received from the "Neptune" and "Alert," were on the whole decidedly satisfactory, in so far as they bore on the question of the safe navigation of Hudson's Strait during a certain period of the year.

In the following year, namely, 1886, it was again resolved to despatch the "Alert" to Hudson's Bay. But this time it was with the object of dismantling the stations in the strait, and taking the observers back to Halifax. It was considered that the duty on which they were employed had been accomplished.

By a fortunate accident I was able to avail myself of an invitation I had received, to take a passage in the "Alert" during this cruise.

I considered myself very fortunate in having the opportunity afforded me of doing so, for it had long been my wish to visit Hudson's Bay, and I had almost decided upon accomplishing this object by travelling from Winnipeg by canoe. The offer, therefore, of going in the "Alert," which would enable me to make the passage of the strait, as well as of the bay, was too good to be refused, and I eagerly availed myself of it. I was thus enabled to form my own judgment of the state and conditions of the ice in Hudson's Strait during at least one season of the year; while my observations, combined with a comprehensive study of all that has been written on the subject, would enable me to form my own views regarding the practicability of the route as a commercial highway. I was also able to form a better estimate relative to the duration of the navigable season.

I might observe that I was quite ignorant of the controversy that had been carried on for some time between those who were in favour of Hudson's Strait as a commercial route and those who were opposed to it. I was, therefore, in a better position to form a perfectly impartial and unbiassed opinion.

Under these circumstances I joined the "Alert" at Halifax, and sailed in her from that port on the 23rd of June.

On the 5th of July we reached the entrance of Hudson's Strait, where we were detained for some days, partly by thick weather and partly by loose streams of ice; but the latter were never packed sufficiently close to prevent even a slow steamer like the "Alert" from making fairly good progress. The ice that we encountered was of a soft brashy consistency, the greater part of it being honeycombed from the action of the water, and in an advanced stage of disintegration. Whilst thus delayed at the entrance of the strait, we observed the same remarkable commotion of the water that had been commented on by Davis, Parry, Back, and other navigators. Davis called it, on the globe of 1593, the "Furious Overfall." It is not easy to account for these turbulent eddyings and overfalls. We frequently observed comparatively large pieces of ice being swept, with great velocity, in opposite directions, although they were close to each other. The ice, on these occasions, was evidently very much influenced by local forces, such as tides. So far as we were able to discover, the flood—or west-going tide—caused the ice to slacken, whilst a contrary effect appeared to be exercised on it by the ebb. From the 9th to the 11th of July scarcely any ice was seen, and a distance of over 200 miles was accomplished in about 36 hours. This fact alone, without further evidence, is in itself sufficient to show how free the eastern part of the strait was from ice; for the "Alert," if driven at her full speed, could only steam about six knots an hour.

Early on the morning of the 11th of July we arrived off the station on the north side of the strait, and anchored in a snug little bay called Ashe Inlet. The observers were found to be in perfect health, and they had spent a pleasant winter, having been well supplied with reindeer meat by the Eskimos. They informed us that the ice did not form in the strait before December, and that the channel was perfectly free for navigation during the entire month of November. Game appeared to be plentiful in the neighbourhood of the station. Numerous herds of reindeer were met with during the winter, and hares were reported as abundant on an adjacent island; whilst bears, seals, and walrus were frequently seen.

After leaving Ashe Inlet the "Alert" continued her passage through the strait, but her progress was so retarded by ice, that it took her nine days to accomplish a distance of 300 miles. This slow progress was mainly caused by the absence of sufficient steam power to enable her to thread her way through the loose ice, and also by a want of vigilance in taking advantage of the various movements of the ice. A knowledge of ice navigation, like everything else, cannot be acquired at once. Practical experience, unceasing vigilance, and a happy knack of doing the right thing at the right moment, are essential qualifications for those seamen who desire to become successful ice navigators.

The ice that we encountered in the western part of the strait was somewhat different, and heavier than the ice we passed at the eastern entrance. It was composed of small pieces, packed loosely, appearing as if the floes had been broken up and then drifted together. This peculiar feature of the ice in Hudson's Strait is one that I never observed in other northern seas, and it is worthy of consideration when the question of the practicability of navigating the strait is under examination. For it is these innumerable small pieces that, in a great measure, deprive the pack of the force necessary for the serious injury of any vessel that is beset in it. When there is a nip, the small pieces, being composed of soft brashy ice, act as a cushion between the ship and the larger floes, thus protecting her from violent pressure.

The greater part of the ice was, in my opinion, formed in Fox's Channel, whence it drifts down to the strait after the disruption of the ice in the summer. Occasionally a few large floes were seen, some of which I estimated to be about half a mile in length, but a floe of this size was quite exceptional. The average thickness of the floe ice was 9 feet, but it was all more or less rotten, and rapidly dissolving.

A circumstance worthy of note in connection with the heavier and larger floes that we met with, was the irregularity and unevenness of their surfaces. A perfectly level floe of any extent, having a flat surface, was rarely seen. They were usually crowned with a succession of excrescences resembling small hillocks. This gave me the impression that the floes were composed of many small pieces of ice which, having survived the preceding summer's thaw, had been cemented together into one large mass by the snow and frost of the succeeding winter. Many of these floes were discoloured by dirt and débris, and on a few of them I noticed thick mud adhering, showing that they were formed in the immediate vicinity of land. The heavier ice we encountered had probably drifted down from Fox Channel, where large thick floes are known to exist.

No icebergs were seen to the westward of the Savage Islands, which seems to show that all those we passed to the eastward and at the entrance of the strait, had floated down from Davis's Strait, or at any rate were the produce of glaciers north of Resolution Island. During the time that we were in the strait the weather was generally fine, the average temperature being about 35° Fahr., although on some days the thermometer would rise to 50°. The prevailing wind was from the westward, but from whatever direction it blew, it appeared to have but little effect on the movements of the ice. When we have more accurate information regarding the tides in Hudson's Strait, further light will in all probability be thrown on the movements of the ice.

After being in the ice for upwards of eight days, the "Alert" arrived at Digges Island (where one of the observatories had been established) on the 20th July. This island, which forms a leading feature in the story of Hudson's voyage, consists of bare hills of gneiss, rising to a height of about 500 feet. The hills are intersected by broad valleys, carpeted with moss and coarse grass. The vegetation compares very unfavourably with that of some of the small islands on which I have landed off Novaya Zemlya, and which are in a much higher latitude. On the coasts of the latter the southern current warms the air and produces a comparatively luxuriant flora, while the former is exposed to cold Arctic streams.

After leaving Digges Island the open water of Hudson's Bay was reached, and from that time, with the exception of passing through a few loose streams of broken-up stuff, no ice was seen. The "Alert" dropped anchor in Churchill Harbour on the 29th of July, without encountering any further difficulties from the enemy with which she had been contending for ten days. From Churchill we proceeded to York Factory, where I left the ship, proceeding on to Winnipeg by canoe.

On her return passage through Hudson's Strait, the "Alert" revisited the different stations without experiencing any difficulties from the ice, and having embarked the observers and their attendants, she returned to Halifax.

The result of all the experience, gathered from voyages during two centuries, and from more recent observations at the stations, is that Hudson's Strait is perfectly navigable and free from ice in August, and later in the season. It must be remembered that this passage has been successfully accomplished nearly every year for the last two centuries, while the vessels that have been employed on the service have been ordinary sailing ships, dependent entirely on wind and weather. It is very rare indeed that they have failed to get through, and still more rare that any of them have been destroyed by the ice. It appears from the official records of the Hudson's Bay Company that Moose Factory, on the southern shore of the bay, has been visited annually by a ship since 1735, with but one exception, namely, in 1779, when the vessel for once failed to achieve the passage of the strait. The percentage of losses by shipwreck among these vessels employed in Hudson's Bay is far less than would have to be recorded in a like number of ships engaged in general ocean traffic. Since the keel of Hudson's good ship the "Discovery" ploughed the waters of the strait, the passage has been made over 500 times, whilst the losses due to the ice might be summed up on the fingers of one hand; and some of these losses were due to causes with which the ice had nothing to do. For instance, the recent loss of the "Cam Owen" was in no way connected with the ice.

In conclusion, after reviewing the physical aspects of the region, and the record of voyages, we must again call to mind the fact that the vessels employed on Hudson's Bay service have hitherto been sailing ships. Steam has now robbed ice navigation of many of its difficulties and dangers, and it is only fair for us to assume that, with the appliances that science has since revealed to us, we can, in these days, achieve with greater ease and celerity, and with more assured certainty, as much as was accomplished by Hudson and Baffin, by Button and Luke Fox, in their rude and poorly-equipped fly-boats.

The vessel, however, to be employed on such a service, should be specially constructed to resist ordinary ice pressure, and should be provided with power to be able to steam from 10 to 12 knots at least. We, in the "Alert," were frequently detained for many consecutive hours at a time, for want of power to propel the ship through loose streams of ice, which an ordinary steamer would have had no difficulty in penetrating. It is necessary that all vessels employed in ice navigation should be strengthened, especially in the bows, not so much for the purpose of resisting the pressure of the ice, if beset, as to repel the severe blows which must occasionally be inflicted by unavoidably striking unusually heavy pieces whilst threading their way through a stream of ice.

The case, then, can be very briefly stated. If sailing ships have annually taken the furs, and other merchandise, of the Hudson's Bay Company through the strait for the last two centuries, *à fortiori* it may be looked upon as certain that powerful steamers will be able to do the same for the produce brought to the west coast of Hudson's Bay by a railway from Winnipeg.

The establishment of new routes for commerce is always a gain to the science of geography. In some cases new regions have to be discovered and explored. In others, the physical aspects of an already known region must be more carefully studied, and many points of interest relating to the action of climate, or of winds and currents, may be ascertained. The proposed Winnipeg and Hudson's Bay railroad is a striking instance. The objections of opponents to the route have had to be carefully examined. All former experience had to be collected, maturely considered, and passed in review. Observatories had to be established at several points, to make certain whether the historical records actually coincided with physical facts as they now exist. The route itself had to be sailed over and explored. All these various researches have been as great a gain to geography as to commerce. They have enriched our science with a fresh stock of information, have revised previous conceptions, and confirmed or rejected, as the case may be, the theories and views which may have been put forward. From this point of view, and from this point of view alone, can commercial or political questions receive consideration here. The study of the Hudson's Bay route involves a problem for which physical geography alone can furnish a solution; and on those legitimate grounds I have ventured to submit it for the consideration of the meeting. My labours will be more than rewarded if I have succeeded in my endeavour to give a new point of interest to a region which, though already well known, is exceedingly interesting, and is on the direct road to unknown parts of the earth.

APPENDIX I.

REPORT ON THE RESOURCES OF THE GREAT MACKENZIE BASIN.

Season 1888.

The Select Committee appointed by your Honourable House to inquire into the resources of the Great Mackenzie Basin, and the country eastward to Hudson's Bay, have the honour to make their third report as follows:—

Your Committee desire that this report be considered an interim one and the estimates given to be approximate, inasmuch as they are based upon evidence received up to this date, and a final report can only be made when answers shall have been received to questions sent to officers of the Hudson's Bay Company, missionaries, Arctic explorers, an others, now resident in, or who have visited parts of the country within the scope of your Committee's inquiry. A list of these names and of the inquiries made is herewith submitted.

Your Committee desire to acknowledge the courtesy of the Department of Marine and Fisheries, Agriculture, Customs, Railways, and Canals, and of the Interior, with its Geological Survey, and Indian Branch; also the value of information received from Professors Selwyn, Bell, Dawson, Macoun, and Saunders, as well as from gentlemen a list of whose names is submitted herewith, from whom evidence was received of very great value.

Your Committee also desire to state that they have incurred no expense, other than that authorised by your Honourable House, except the sum of $41.25 for outside printing necessitated by the desire of the Committee to immediately forward their list of questions to far distant posts. The lithographing of the maps which accompany this report being paid for by members of the Committee themselves.

The evidence your Committee have been able to obtain up to this date has been of an unusually valuable character, being principally oral, and from those who had exceptional opportunities of acquiring information, and after carefully comparing this evidence your Committee have arrived at the following conclusions, in which they have endeavoured, where estimates are given, to be within the limit authorised by the information in question.

REGARDING NAVIGATION.

1st. The extent of the scope of the inquiry covers one million two hundred and sixty thousand square statutory miles, which area includes none of the islands of the Arctic Archipelago.

2nd. Its coast line on the Arctic Ocean and Hudson's Bay measures about 5,000 miles, which estimate does not include the coast lines of inlets or deeply indented bays.

3rd. That over one-half of this coast line is easily accessible to whaling and sealing crafts.

4th. The navigation coast lines of the larger lakes of the region in question amount to about 4,000 miles, while its total lacustrine area probably exceeds that of the eastern Canadian American chain of great lakes.

5th. That there is a river navigation of about 2,750 miles, of which 1,390 miles is suitable for stern-wheel steamers, which with their barges may carry three hundred tons; the remaining 1,360 miles being deep enough for light draught sea-going steamers.

6th. That there is a total of about 6,500 miles of continuous lake coast and river navigation, broken only in two places.

7th. That the two breaks in question are upon the Great Slave and Athabasca Rivers, the first being now overcome by a 20-mile wagon road from Fort Smith southwards on the Great Slave River, and the latter being a stretch of 70 miles on the Athabasca, of questionable navigation above Fort McMurray, down which flat boats or scows descend, but cannot ascend, and which about 50 miles of wagon road would overcome, while some improvement of the rapids might render the whole river navigable.

8th. That with suitable steam crafts this river and lake navigation may be connected with Victoria and Vancouver by way of the mouth of the Mackenzie, the Arctic Ocean, and Behring Straits and Sea, and it is now connected on the south by 90 miles of wagon road, between Athabasca Landing and Edmonton, with navigable water in the Saskatchewan River.

ARABLE AND PASTORAL LANDS.

9th. That within the scope of the Committee's inquiry there is a possible area of 656,000 square miles fitted for the growth of potatoes, 407,000 square miles suitable for barley, and 316,000 square miles suitable for wheat.

10th. That there is a pastoral area of 860,000 square miles, 26,000 miles of which is open prairie with occasional groves, the remainder being more or less wooded; 274,000 square miles, including the prairie, may be considered as arable land.

11th. That about 400,000 square miles of the total area is useless for the pasturage of domestic animals or for cultivation. This area comprising the Barren Grounds and a portion of the lightly wooded region to their south and west.

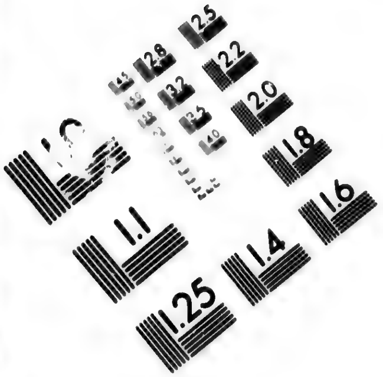
12th. That throughout this arable and pastoral area latitude bears no direct relation to summer isotherms, the spring flowers and the buds of deciduous trees appearing as early north of Great Slave Lake as at Winnipeg, St. Paul and Minneapolis, Kingston, or Ottawa, and earlier along the Peace, Liard, and some minor western affluents of the Great Mackenzie River, where the climate resembles that of western Ontario.

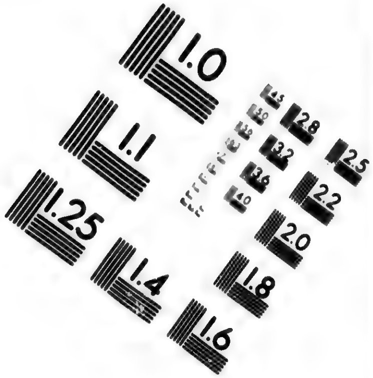
13th. That the native grasses and vetches are equal and in some districts superior to those of eastern Canada.

14th. That the prevailing south-west summer winds of the country in question bring the warmth and moisture which render possible the far northern cereal growth, and sensibly affect the climate of the region under consideration as far North as the Arctic circle, and as far east as the eastern rim of the Mackenzie Basin.

FISHERIES, FORESTS, AND MINES.

15th. The immense lacustrine area of the eastern and northern portions of the area under consideration implies, from the evidence given regarding the quantity and quality of fresh water food fishes, the future supply of a great portion of the North American continent; while, though there has been obtained less evidence regarding sea fish, yet the following have been found on the northern and eastern





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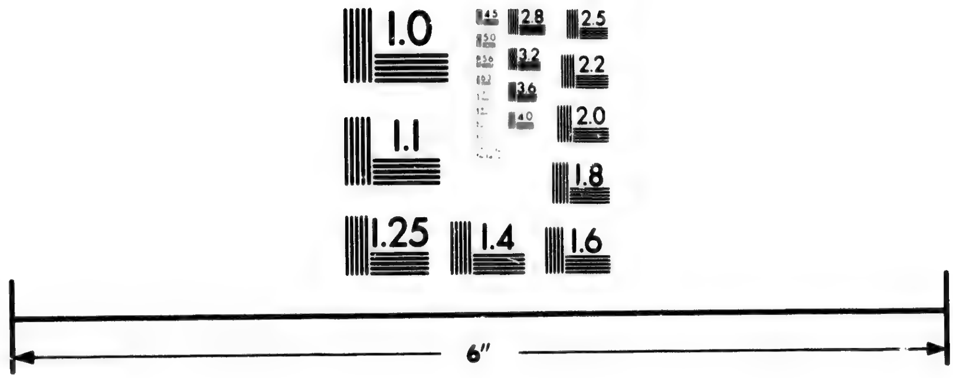

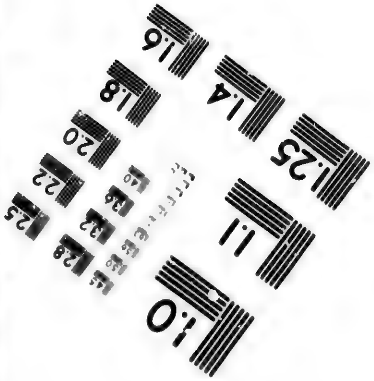

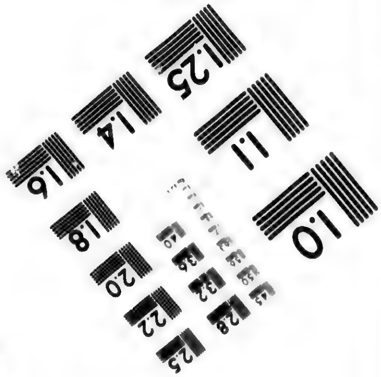

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coast within the scope of the present inquiry, viz.: salmon, on four of the rivers emptying into Hudson's Bay on its western shore, and in all the rivers flowing into the Arctic Ocean, except the Mackenzie, where an entirely different but also valuable species, the Salmo Mackenziei, having the local name of the Inconnu, exists in great numbers. The capeling is found on the coast of the Arctic Ocean and Hudson's Bay, thus implying the presence of cod upon banks near by, and the rock cod has been frequently taken. The Greenland, or harp seal, and the grey square flipper seal are common to the eastern coasts, while the present favourite whaling grounds of the New England whalers are Hudson's Bay, Fox Channel, and Boothia Bay. These animals are all found with the walrus and porpoise off the mouths, and in the estuary of the Mackenzie, as well.

16th. The forest area has upon it a growth of trees well suited for all purposes of house and ship building, for mining, railway and bridging purposes, far in excess of its own needs, and of great prospective value to the treeless regions of Canada and the United States to the south, the growth on the Laurentian formation being scant, but the alluvial portion has upon it (on the river of its name and elsewhere) the "Liard," a balsam poplar, sometimes called Balm of Gilead, or rough bark poplar, 120 feet high, with a stump diameter of 5 to 6 feet. The white spruce, 150 feet high, with a stump diameter of 4 to 5 feet; the larch, of about the same size, and the banksian pine, whose straight stem is often 100 feet long, with only two feet of diameter at the stump.

17th. Of the mines of this vast region little is known of that part east of the Mackenzie River, and north of Great Slave Lake. Of the western affluents of the Mackenzie enough is known to show that on the headwaters of the Peace, Liard, and Peel Rivers, there are from 150,000 to 200,000 square miles which may be considered auriferous, while Canada possesses west of the Rocky Mountains a metalliferous area, principally of gold-yielding rocks, thirteen hundred miles in length, with an average breadth of four to five hundred miles, giving an area far greater than that of the similar mining districts of the neighbouring Republic.

18th. In addition to these auriferous deposits, gold has been found on the west shore of Hudson's Bay, and has been said to exist in certain portions of the Barren Grounds. Silver on the Upper Liard and Peace Rivers, copper upon the Coppermine River, which may be connected with an eastern arm of Great Bear Lake by a tramway of 40 miles, iron, graphite, ochre, brick, and pottery clay, mica, gypsum, lime, and sandstone, sand for glass and moulding, and asphaltum, are all known to exist, while the petroleum area is so extensive as to justify the belief that, eventually, it will supply the larger part of this continent, and be shipped from Churchill, or some more northern Hudson's Bay port, to England.

19th. Salt and sulphur deposits are less extensive, but the former is found in crystals equal in purity to the best rock salt, and in highly saline springs, while the latter is found in the form of pyrites, and the fact that these petroleum and salt deposits occur mainly near the line of division, between deep water navigation and that fitted for lighter craft, give them a possible great commercial value. The extensive coal and lignite deposits of the lower Mackenzie and elsewhere, will be found to be of great value when the question of reducing its iron ores and the transportation of the products of this vast region have to be solved by steam sea-going, or lighter, river craft.

20th. The chief present commercial product of the country is its furs, which, as the region in question is the last great fur preserve of the world, are of very great present and prospective value, all the finer furs of commerce being there found, and the sales in London yearly amounting to several millions of dollars.

21st. The Indian population is sparse, and the Indians, never having lived in large communities, are peaceable, and their general character and habits, as given by witnesses, justify a hope that the development of the country, as in the case of the Indians of British Columbia, may be aided by them without great danger of their demoralization, and with a reasonable hope that, as in the case of the Indians mentioned, their condition may be improved.

Your Committee desiring to refer briefly to the evidence upon which they have based these conclusions, may explain that, very early in their investigations, they became convinced that very little more was known of the northern and eastern portion of the area committed to them for investigation, than was known of the interior of Africa or Australia. Arctic explorers had indeed traversed its coast line, and descended two of the rivers which, east of the Mackenzie, flow into the Arctic Sea, but the object sought by them was one which had no relation to that of the present inquiry, and it is only incidentally that their records are now valuable. The knowledge of missionaries and officers of the Hudson's Bay Company is chiefly confined to the watercourses and the great lakes, while scientific exploration has not as yet extended north of Great Slave Lake.

In referring again to the navigation of this region, all the evidence has agreed as to the great extent of unbroken navigation, and this fact has been of great use to the Hudson's Bay Company. who have always used the waterways, even when circuitous and difficult, rather than resort to land carriage, and their inland posts to as far north as the Arctic circle are now supplied from their central depôt at Fort Garry, with only 114 miles of land carriage, four of this being by tramway at the Great Rapids of the Saskatchewan, ninety miles of wagon transport from Edmonton to Athabasca Landing, thence by steamer and flatboat, to Fort Smith on the Great Slave River, where twenty miles of wagon road connects the shallow with deep water navigation, and the steamer "Wrigley" distributes them to the various posts, down to the mouth of the Mackenzie just above its estuary, where the river is said to be six miles wide, and up Peel River which joins the Mackenzie near that point to Fort Macpherson, on that gold-bearing stream. The great lakes, which receive the drainage of this vast region, and give an equal flow to the Mackenzie, all have deep water navigation, and like most lakes of the Laurentian formation are studded with islands.

The most southern source of the Great Mackenzie River is a stream fed by the glaciers of Mounts Hooker and Brown, two of the highest of the Rocky Mountain chain, in latitude 52° 30'. and this soon becomes a navigable stream, preserving that character except at the breaks mentioned, during the nearly 2,500 miles of its course, to the Polar Sea. As already mentioned these western affluents will form valuable links, as a means of taking in machinery and mining supplies, to the upper waters of the Peace and Liard Rivers which are now inaccessible for heavy machinery from the west coast, and the cost of taking in provisions, makes in mining and prospecting efforts a serious desideratum. The navigation upon the Liard River also will be an important factor in the future food supply to the great mining region of the upper Yukon and Peel Rivers.

A reference to the valuable evidence obtained by your Committee will show that navigation from Behring Straits to the mouth of the Mackenzie, and probably as far east as Wollaston Land, may be had for three months in each year, the soundings given on the Admiralty Chart of that portion of the Arctic Sea revealing an average depth of about 20 fathoms, which is a considerable depth in what is known to be generally a shallow sea. The western branch of the estuary of the Mackenzie is said to be the outlet which has the deepest waters, and it is respectfully submitted that much good might accrue were the Dominion Government party now working its way from the Yukon towards Peel River, and the Mackenzie, to descend either of these streams, and examine the western and other branches of the estuary of the Mackenzie.

To convey to your Honourable House the distances which separate the navigable waters of the Mackenzie Basin from the eastern and western sea coasts, and from navigable rivers and railways to the south and south-east, the following table of distances has been taken up from the evidence. The lengths are in straight lines as follows:—

From the head of Great Slave Lake to head of Chesterfield Inlet, 320 miles; from the head of Athabasca Lake to the harbour of Churchill, 440 miles; from Fort McMurray, at the junction of the Clearwater with the Athabasca below the 70 miles of questionable navigation, to the following places on the Saskatchewan: Prince Albert, 300 miles; Fort Pitt, 220 miles; Victoria, 179 miles; Edmonton, 225 miles; from Calgary, on the Canadian Pacific Railway, to Athabasca Landing, on the Athabasca River, 250 miles; from head of Little Slave Lake, to Peace River Landing, in the Peace River, 65 miles; from Hazleton, on the Skeena River, to Peace River in the Pass, 150 miles; from Fort Mumford, on the Stikeen River, to Fort Liard on the Liard River, 370 miles.

A good deal of difficulty has been experienced by the Committee in endeavouring to obtain the exact catch of furs in the region under consideration, and no definite, or direct, information has been obtained; they have, however, obtained lists of furs offered for sale in 1887, in London, by the Hudson's Bay Company, and C. M. Lampson & Co., the consignees of many of the furs of British North America, and from these lists they find the following to be a summary of one year's catch:—

Otter	14,439
Fisher	7,192
Fox (silver)	1,[illegible]67
Fox (cross)	6,785
Fox (red)	85,022
Fox (white)	10,257
Fox (blue)	1,440
Fox (kitt)	290
Lynx	14,520
Skunk	682,794
Marten	98,342
Mink	376.223
Beaver	104,279
Musquash	2,485,368
Extra black Musquash	13,944
Wolf	7,156
Wolverine	1,581
Bear (all kinds)	15,942
Musk Ox	1[illegible]8
Badger	3,739
Ermine	4,116
Swan	57
Rabbit	114,822
Hair Seal (dry)	13,478
Sable	3,517
Fox (grey)	31,597

It will be seen by those who have a knowledge of the great value of these rich northern furs, a large proportion of which may be presumed to have come from the Mackenzie Basin, how large and important that trade has been, and it is expedient that, without unduly interfering with the rights of settlers or the usual privileges of Indians, this great fur trade should be fostered, and even made a source of direct revenue to the Dominion.

The Right Reverend Bishop Clut, in his evidence, called attention to the damage to this interest caused by the use of "poison," which is strychnia of the most powerful kind, in the capture of such animals as the fox or wolf. He deprecates its use, first on account of the danger to those using it, and from the fact that it caused useless destruction, inasmuch as the foxes and wolves that swallow the frozen bait have time to run and die far beyond where they may be found, and in the case of other animals, for which it is not intended, it destroys directly by eating the bait, and indirectly by the eating of the animals which have been poisoned by it.

Again, there is great danger of some species of fur-bearing animals becoming extinct by the greater ease in their capture, such as the beaver, which many years ago became almost extinct in the United States when fashion necessitated the exclusive use of its fur in felt and other hats, and more recently the same prospect of extirpation threatened the mink which now threatens the south sea or fur seal; these considerations pointing to the expediency of the Government making a measure of protection a source of revenue by the leasing of certain fur districts with a limitation as to the catch of certain kinds of its furs.

Of the fresh water food fishes of the region, Back's "grayling," an excellent species not prevalent elsewhere, seems to be found everywhere in its rivers, and even west of the Rocky Mountains, but the staple product of its lakes and large rivers seems to be whitefish of great weight and excellent flavour, and trout, often reaching forty pounds in weight; and evidence goes to show that the farther north the greater the yield of fish, till the quantity becomes enormous. As an illustration, the following is given from the evidence of Prof. Macoun, who quotes Sir John Richardson to the effect that one of the early overland Franklin expeditions took fifty thousand white fish on a north-eastern arm of Great Bear Lake, and Sir John Richardson also states that the great lake trout swarm in all the northern great lakes.

In regard to the salmon fisheries, it would appear from the evidence that salmon are abundant in the rivers and along the coast of the north-west side of Hudson's Bay, as well as in the rivers of the northern shores of the Continent. Your Committee consider it advisable that means should be adopted to ascertain more accurately the extent and value of the salmon fisheries of these regions, with a view to utilising them for the purposes of commerce, and for the revenue which they may afford.

The seas adjoining the great territory which your Committee has had under investigation, are frequented by whales of different species, walruses, narwhals, and a variety of seals.

All these animals are valuable for their oil, but the large species of whales have heretofore been most sought for. Only a few years ago these animals had a much more extensive range than at the present time. Owing to improvements in navigation and methods of capture, they have, of late years, fallen an easier prey to their pursuers, and have taken shelter in the less frequented seas of the northern coasts of Canada. Now they are being pursued to their last retreat by foreign whalers, and some species are threatened with complete extinction in a few years if this condition continues. It is to be borne in mind that whales are long lived and slow breeding animals. The American whalers attack them with harpoons, explosive bombs and lances, fired from large swivel-guns carried on steam launches, instead of the old-fashioned weapons thrown by hand from rowboats. These methods not only destroy the whales with greater facility, but inspire the survivors with such terror that they seek the most distant and inaccessible parts of the northern seas, and have entirely disappeared from the waters in which they lived only a few years ago.

Your Committee are informed that the Russian Government claim jurisdiction over the whale fisheries of the White Sea, and exact a heavy licence from each vessel engaged in the fishing, and that the Alaska Fur Company asserts a similar authority over the seal fisheries of Behring Sea, both of which are open to the ocean, while Hudson's Bay, Boothia Bay, and other bays and channels in the northern part of the Dominion, which are resorted to by foreign whalers, may be considered as closed seas, being almost completely surrounded by our own territory. Your Committee would, therefore, recommend that some measures may be adopted with a view to protecting the whale fisheries of our northern waters, and at the same time of deriving a revenue therefrom. Should this not be done, then, as soon as the larger whales shall have become extinct, the slaughter of our smaller oil-producing mammals will commence, and as these creatures live in shallow water or nearer shore, further encroachments on our rights will probably result.

The evidence submitted to your Committee points to the existence in the Athabasca and Mackenzie Valleys of the most extensive petroleum field in America, if not in the world. The uses of petroleum, and consequently the demand for it by all nations, are increasing at such a rapid ratio that it is probable this great petroleum field will assume an enormous value in the near future, and will rank among the chief assets comprised in the Crown domain of the Dominion. For this reason your Committee would suggest that a tract of about 40,000 square miles be, for the present, reserved from sale, and that as soon as possible its value may be more accurately ascertained by exploration and practical tests; the said reserve to be bounded as follows: Easterly by a line drawn due north from the foot of the Cascade Rapids on Clearwater River to the south shore of Athabasca Lake; northerly, by the said lake short and the Quatre Fourche and Peace Rivers; westerly, by Peace River, and a straight line from Peace River Landing to the western extremity of Lesser Slave Lake, and southerly, by said lake and the river discharging it to Athabasca River and Clearwater River as far up as the place of beginning.

Your Committee regret that they have made so long a report, but trust that an excuse will be found in the fact that upon a map of similar projection and scale the region in question occupies an area greater than the Australian continent or two-thirds of Europe, covering parts of the British Islands, Norway, Sweden, Denmark, Germany, Austria, and a part of France and Russia.

Your Committee have reason to believe that a comparison of the capabilities of this extent of country in our own continent, exceeds in extent of navigation, area of arable and pastoral lands, valuable fresh water fisheries, forests and mines, and in capacity to support population, the continental part of Europe to which we have referred.

Many important points have, therefore, been omitted from this report, for information upon which your Committee beg to refer your Honourable House to the evidence itself; they have, however, accompanied this report, as being a necessary adjunct, with four maps of a size suitable to form two pages of this report, carefully prepared by Robert Bell, Esq., M.D., LL.D., Assistant Director of the Geological Survey; the first showing upon it in colours, the northern and eastern extent of possible potatoe, barley, and wheat growth, the pastoral, prairie, and wood region, and the barren grounds; the second showing in colours the mineral deposits in the Mackenzie Basin; the third shows the southern limit of the feeding grounds of the musk ox, and of the reindeer; the northern range of the wolverine, otter, beaver, black bear, and Virginia deer, the former range of bison and wood buffalo, and the present range of the moose, the Greenland seal, and of the larger whales; and the fourth shows in colours the extent of the river, lake, and sea coast navigation, and the coal and lignite deposits.

Your Committee believe that these are necessary for the proper information of your Honourable House, and the full explanation of the evidence submitted herewith, and should this suggestion be adopted, they will feel that with this report, and the evidence herewith, they will have done all that it was possible to do since the date of their appointment, and the receipt of their instructions, to inform your Honourable House, and the people of this country, upon the resources of Canada's Great Reserve.

All of which is respectfully submitted.

JOHN SCHULTZ.
Chairman.

THE NORTH-WEST OF CANADA.

THE GREAT CORN, CATTLE, AND MINERAL COUNTRY OF THE FUTURE.

Westminster Review March, 1893.

When Lord Palmerston introduced the Bill to the House of Commons in February 1858 for the transfer of the Government of India from the East India Company to the Crown, referring to the Hudson's Bay Territory, on which a Select Committee of the House had taken evidence and reported in the previous Session, he said: "One could easily imagine that a wilderness in the northern part of America, where nothing lives except fur-bearing animals and a few wild Indians but little removed from the lower creation, might be confined to a company whose chief function should be to strip the running animals of their furs and to keep the bipeds sober."

Mr. Gladstone, however, took a more favourable view of the future of the Great North-West, for during the same Session of Parliament, on the motion of Mr. John Arthur

Roebuck, "That the privileges of the Hudson's Bay Company, about to expire, ought not to be renewed," said: "There is a large portion of the surface of the earth with regard to the character of which we have been systematically kept in darkness, for those who had information to give have also had an interest directly opposed to imparting it. Now the truth is beyond question that a great part of this country is highly valuable for colonisation purposes; and it is impossible to state in too strong language the proposition that the Hudson's Bay Company is, by its very existence and its character, the enemy of colonisation."

The opinions so forcibly expressed by Mr. Gladstone have been confirmed in a manner far surpassing what was ever supposed at that period.

In 1867 the Dominion Act of Canada was passed, and in 1870 the Government came into possession of the immense region formerly governed by the Hudson's Bay Company. Since that period a railway has been construted from Halifax on the Atlantic Ocean to Vancouver on the Pacific, a distance of 3,711 miles, entirely through British territory, and a line of British mail steamers established, second to none in the world, running between Vancouver, Yokohama, Shanghai, and Hong Kong, conveying a portion of the British mails and troops to and from the United Kingdom and India, whilst an uninterrupted lake and river navigation, suitable for ocean-going vessels, has been all but perfected from the Gulf of St. Lawrence to the head of Lake Superior.

Fort Garry, which in 1870 contained 250 inhabitants, has now become the handsome city of Winnipeg, with a population of over 30,000, and adorned with many buildings which would do credit to London. It is the centre of a magnificent railway system, extending from the Atlantic to the Pacific, with many hundreds of miles of branch lines running north and south. There is not probably in the history of the world such a rapid physical and permanent development. The capability to produce all the food that the United Kingdom requires in the form of corn and cattle by the North-West of the Dominion of Canada, is limited only by the supply of labour and improved transit to the seaboard.

To fully appreciate the magnitude and importance of the Dominion of Canada is to compare it with Russia in Europe.

The Dominion comprises an area of 3,400,000 square miles, whilst European Russia is only 2,095,000. They lie mainly within the same degrees of latitude. The great inland sea of Hudson's Bay is in the same latitude, and is twice the size of the Baltic. The great lakes and the St. Lawrence navigation are not equalled in Russia, and the Nelson River, with its lakes and tributary streams, drains a larger fertile area than the Volga, or the Don and Dneiper combined; and the Mackenzie River, with its lakes and tributary streams, is equal to the Dwina and the mouth of the White Sea. In fact, according to the most authentic Government reports, the fertile area of the Dominion is fully equal in climate and capability of producing cereals and cattle to the whole of Russia in Europe. Port Nelson on Hudson's Bay, the very centre of the North-West, is much nearer to London than the Russian ports of the Black Sea. There are 14,000 miles of railway in the Dominion as compared with 18,500 in Russia, 15,000 miles of internal navigation, and the whole country under the Dominion of the British Crown, where life and property and liberty are absolutely secure, and yet Russia in Europe has a population of ninety-five millions, whilst the Dominion of Canada has only about five millions.

The great fertile Belt of the North-West extends from the city of Winnipeg, the capital of the province of Manitoba, on the east to the foot hills of the Rocky Mountains, a distance of about 920 miles, and from the 49th parallel of latitude north to the watershed of the North Saskatchewan, an average distance of 350 miles, embracing an area of 322,000 square miles, or 206,080,000 acres, two-thirds of which has been proved to be capable of producing the finest wheat in the world, and the rest is admirably adapted for stock raising and dairy farming. The whole country is well watered with long and numerous rivers and smaller streams, a moderate growth of wood, and extensive coal deposits. The soil is generally of a deep rich loam, requiring no manure, and the climate is described by long residents in the country as one of the most invigorating and healthy in the world. Land can be acquired in various ways, from free grants of 160 acres to any male adult settler over eighteen years of age, up to 10s. to 40s. an acre, with easy means of payment and near a good market.

There was under cultivation in 1891 about 900,000 acres, which produced a surplus of wheat available for export of 25,000,000 bushels, on an average of 25 bushels to the acre, and 350,000 acres in oats and barley, producing 20,000,000 bushels. In addition to this, the cattle ranches number a herd of about 600,000. Dairy farming is also carried on with good profit.

The harvest last year was again very good, and more especially as to quality; and, although the price of wheat rules low, the farmers are highly prosperous and contented. A large number of farmers are leaving the North-West States of the Union and purchasing lands and settling in the fertile belt of the Dominion.

The country at present under local government comprises the Province of Manitoba, covering an area of 64,000 square miles, with Winnipeg as its capital, and the three territories of Assiniboia, Saskatchewan, and Alberta, covering an area of 303,000 square miles, with Regina as their capital.

To the North-West of the fertile belt lies the territory of Athabasca and the Great Mackenzie Basin, on the resources of which a Committee of the senate of the Dominion was appointed in 1887 to take evidence and report, and in which amongst other things, they say, "That within the scope of the Committee's inquiry there is a possible area of 650,000 square miles fitted for the growth of potatoes, 407,000 square miles suitable for barley, and 316,000 square miles suitable for wheat; that throughout this arable and pastoral area latitude bears no direct relation to summer isotherms, the spring flowers and buds of deciduous trees appearing as early north of the Great Slave Lake (lat. 63°) as at Winnipeg, St. Paul, Minneapolis, Kingston, or Ottawa, and earlier along the Peace, Liard, and some minor affluents of the Great Mackenzie River, where the climate resembles that of Western Ontario.

"That on the headwaters of the Peace, Liard, and Peel Rivers there are from 150,000 to 200,000 square miles which may be considered auriferous.

"That the evidence submitted to the Committee points to the existence in the Athabasca and Mackenzie Valleys of the most extensive petroleum field in America, if not in the world. The uses of petroleum, and consequently the demand for it by all nations, are increasing at such a rapid rate that it is probable that this great petroleum field will assume an enormous value in the near future, and will reckon among the chief assets comprised in the Crown domain of the Dominion.

"That there is a coal formation covering an area of 100,000 square miles, and that the lakes and rivers abound in fish and large and small game in enormous numbers.

"That the climate is remarkably healthy, many of the witnesses describing it as one of the finest in the world.

"That upon a map of similar projection and scale, the region in question occupies an area greater than the Australian Continent, or two-thirds of Europe, covering part of the British Islands, Norway, Sweden, Denmark, Germany, and Austria, and part of France and Russia; and that the Committee have reason to believe that a comparison of the capabilities of this extent of country on our continent exceeds in extent of navigation, area of arable and pastoral lands, valuable fresh water fisheries, forests and mines, and in capacity to support population, the continental part of Europe to which we have referred."

RAILWAYS AND NAVIGATION.

The Canadian Pacific Railway, starting from the head of Atlantic navigation at Montreal, reaches Winnipeg by a distance of 1,421 miles. From Winnipeg, running through the fertile belt for 920 miles, it is fed by thirteen branches, extending north and south, and aggregating about 1,500 miles, all centring in Winnipeg. From Winnipeg, coming east, the head of lake navigation is reached by a single line of railway of 423 miles. Two other outlets are afforded through North Dacotah and Minnesota, in the United States to Duluth and St. Paul, etc., etc. Fort William and Duluth are about equi-distant by lake, river and canal navigation to Montreal and New York, the distance by water to Montreal being about 1,800 miles, and to New York 2,000 miles. The all-rail route from Winnipeg to New York is 1,779 miles, and to Montreal 1,421 miles. The average cost of the carriage of wheat from Winnipeg to the seaboard, whether at Montreal, Portland, or New York, is about 20 cents per bushel, or 20s. per ton; in addition to this heavy charge, the present outlets are inadequate to move the crops, the elevators are all full, and a great grain block has occurred.

The necessity of providing shorter and cheaper outlets for the produce of the great North-West to the seaboard has for some time engaged the attention of the Provincial Government of Manitoba and the Dominion Government. The Dominion Government appointed an expedition to test the practicability of the navigation of Hudson's Bay. That expedition was carried out in 1884, 1885, and 1886, and the result has been highly satisfactory. * * * * *

It appears impossible to over-rate the importance of this route, for it would not only effect the great saving on distance in the passage between the Atlantic and Pacific Oceans, but open up the vast region to colonisation, and provide an alternative route through Dominion territory, free from all frontier complications and interruptions.

Lord Durham, in his celebrated Report on the British North American, in 1841, said, in conclusion: "No portion of the American continent possesses greater natural resources for the maintenance of large and flourishing communities. An almost boundless range of the richest soil still remains unsettled, and may be rendered available for the purposes of agriculture. The wealth of inexhaustible forests of the best timber in America and of extensive regions of the most valuable minerals have as yet been scarcely touched. Along the whole line of sea-coast, around each island, and in every river are to be found the greatest and richest fisheries in the world. The best fuel and the most abundant water-power are available for the coarser manufactures, for which an easy and certain market will be found. Trade with the Continent is favoured by the possession of a large number of safe and spacious harbours; long, deep, and numerous rivers and vast inland seas, supply the means of easy intercourse, and the structure of the country generally affords the utmost facility for every species of communication by land; unbounded materials of agricultural, commercial, and manufacturing industry are there. It depends upon the present decision of the Imperial Legislature to determine for whose benefit they are to be rendered available. The country which has founded and maintained these colonies at a vast expense of blood and treasure may justly expect its compensation in turning their unappropriated resources to the account of its own redundant populations. They are the rightful patrimony of the English people, the ample appanage which God and Nature have set aside in the new world for those whose lot has assigned to them but insufficient portions in the old."

JOSEPH NELSON.

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